A SURVEY OF THE MOVEMENTS CULMINATING IN INDUSTRIAL ARTS EDUCATION IN SECONDARY SCHOOLS

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Contributions to Education, No. 670

Published with the Approval of
Professor Fred Strickler, *Sponsor*

Bureau of Publications
Teachers College, Columbia University
New York City
1936

ACKNOWLEDGMENTS

THE writer acknowledges with deep appreciation a debt of gratitude to his sponsor, Professor Fred Strickler, for guidance throughout his graduate work and during the progress of this study. He also wishes to express his appreciation to his advisers, Professors Elbert K. Fretwell and L. Thomas Hopkins, for their helpful criticism. He is especially grateful to his wife, Christine Dorr Stombaugh, for her help and understanding.

R. M. S.

CONTENTS

CHAPTER I

INTRODUCTION

THE New Jersey Council of Education went on record in 1888, suggesting that it might well be expected that the "means of giving instruction in manual training" would improve and develop in a manner similar to that previously experienced by other subject fields. [233 : 8]* In the same year Nicholas Murray Butler expressed the opinion that there had been progress in manual training methods and that there was a greater diversity in imparting instruction in manual training than in the material imparted. He said, "The truth is that progress in this as in other matters goes on without our knowing it, and it is only after the lapse of considerable time that the visible effects of this progress engage out attention." [128 : 2]

Two writers have made a plea that teachers work together to devise some means and methods for teaching manual training which would insure success for the average teacher. The first to make such a plea was Trybom (1894) in an address before the Manual Training Teachers Association of America. [187 : 33] King (1918) supported this view by saying, "The fact that different teachers have different methods of presenting a lesson to a class suggests that some of these methods are decidedly superior to others and if there could be a standard of pedagogical aim and requirement an exchange of experiences would be mutually profitable." [81: 91]

On the other hand, some writers indicate that methods have been largely influenced by tradition rather than by a thoughtful analysis of the problem. Commenting on shop practices in 1891, Richards reported that "Unfortunately, trade methods and trade traditions

* This system of footnotes will be used throughout the study. The first number in the brackets is the number of the reference listed in the Bibliography and the second number indicates the pages cited.

have influenced the character of manual training work in schools altogether too much." [175 : 103] In 1911, Edgerton said, "Recent investigations clearly show that tradition, rather than present day need, still too largely determines the purpose, content and method of industrial subjects in the seventh, eighth and ninth years." [66 : 251]

Likewise, in the same year, Roberts wrote, "We are all too prone to do what we do because someone else has done it, or because it was suggested in any one of the numerous publications." [104 : 119] Winslow, in 1924, referred to the persistence of certain older forms of manual training. [124 : 183] A few years later Strickler remarked that this older type of manual training based on faculty psychology still existed in many places. [39 : 93] Proffitt (1925) stated that "Past practices and procedures are still too influential in determining content and aims of instruction." [205 : 12] Strickler also brings out the tendency of teachers to follow tradition and teach as they were taught. [39 : 44–46]

Although following the line of least resistance may be pleasant to some teachers, Bowman implies that teaching, if it is to be successful, cannot be static, and further states that it is the teacher's responsibility to keep himself professionally up-to-date. [52 : 232] Keeping "professionally up-to-date" now seems to impel the teacher to engage in some individual research project as evidence of his alertness. With the present-day tendencies toward large classes and heavy schedules [106 : 34] he is carrying heavy enough burdens without the additional load of research in his specific field, although a limited amount would undoubtedly prove valuable to him. Randolph suggests a way out of the problem. According to his belief, much criticism of educational methods could be eliminated and better teaching result: "If for every subject of study a reliable history of the development of its teaching practices and of the determining conditions underlying them were available, the enduring complaint about the recrudescence of unworkable practices might pass,—and renewable proposals of practices that in the past proved unworkable would arise only on the basis of convincing expositions of substantially changed conditions." [38 : 47]

A similar idea was expressed by De Garmo in 1887, when he said

that the teacher of subject matter "should present a historical view of his subject in regard to methods, as the best safeguard against a mechanical and slavish copying of educational devices. . . ." [147 : 491] Six years later, Kirkland, in referring to the sentiments of some of the best educational authorities of the time, said, "They consider that in teaching a subject due attention should be given to its rise and development as a factor in education; that a historical view of the subject should be given in regard to methods, as the best safe-guard against a slavish copying of educational devices. . . ." [160 : 410]

PURPOSE OF THE STUDY

In this study the writer proposes to identify certain major movements in industrial arts education and to show what influence, if any, they have had upon present theories and practice; he also proposes to consider those various designs and expedients which industrial arts teachers, in their years of experience in helping pupils to learn, have found useful for this purpose. In the consideration of these major movements attention will be given, in so far as possible, to theories, purposes, methods of instruction and organization, courses of study, time allotments, types of product, and other distinguishing characteristics. Methods of each particular movement will be treated first in a broad way and then in detailed subdivisions.

LIMITATIONS OF THE STUDY

For the purpose of this study the writer has considered those movements, methods, and devices which have arisen in the United States since the establishment of the Boston Whittling School in 1871. He proposes to treat industrial arts on the secondary educational level only, except in so far as certain movements on the elementary or higher education levels have influenced secondary education practices.

No attempt has been made in this study to delve into the earliest developments of the manual training movement in Finland, Sweden, or Russia. Neither has the writer attempted to show the influence of such men as Comenius, Pestalozzi, Froebel, and others who were instrumental in starting movements which have influenced modern

conceptions of education. These early beginnings, important as they are, have all been ably covered from the point of view of industrial arts education by Anderson [1] and Bennett [2] in their histories of industrial education. Furthermore, the writer has made no attempt to show what influence the objective method of teaching of the Oswego movement or the principles of teaching developed during the Herbartian movement may have played in the spread of manual training.

SOURCES OF MATERIAL

In developing this study such sources as city, state, and federal reports, school catalogues, proceedings of numerous organizations related to the field, writings of leading educators, and contemporary examples of industrial arts practices have been drawn upon.

CHAPTER II

TRANSITION OF TERMS

Confusion of Terms

IT WOULD be impossible to talk about school work of industrial nature without using a wide range of confusing terms which have various origins. Vaughn and Mays state:

> Changes in terminology have not always, by any means, indicated changes in the content or character of the work which the terms were supposed to designate. In some cases, new terms have simply been attempts to improve upon the preceding ones in describing a little more accurately the work under consideration. [33 : 56]

Although new terms have been coined, some of the older terms have endured after their period of apparent usefulness has ended. No doubt some terms have existed in certain localities because it would require a legislative act to effect change, while in other localities, the weight of tradition has resisted change. Chicago and St. Louis use the term "manual training." Philadelphia makes use of the term "mechanic arts" to designate the school shop activity work. "Manual education" is a term used extensively in California; while in Nova Scotia "industrial science" is the term commonly used. Many cities designate such school work as "manual arts" or "industrial arts." Among the organizations representing the work, the American Vocational Education Association and the Eastern Arts Association use the term "industrial arts." The Western Arts Association used the term "manual training," until the recent terminological study [192] effected a change to the term "industrial arts."

The same confusion is to be found in the educational publications of the field. There is an *Industrial Education Magazine* published by the "Manual Arts Press." Another magazine is called *Industrial*

Arts and Vocational Education. There is a company called "The Practical Arts Publishing Company." [192 : 112] Articles on school shopwork are listed in the *Readers' Guide* under the heading "manual training." In the *Education Index* the same titles are found under "industrial arts."

A study by Warner [40 : 5] also shows the extent of this confusion. He lists twenty-eight terms used by shop and drawing teachers of Ohio in designating the kind of work they were teaching. Of these 358 teachers, 113 used the term "manual arts," 110 used "manual training," 74 used "industrial arts," and 45 used the term "vocational teaching." It is safe to assume that all these persons were referring to the same or a very similar kind of school activity work.

Industrial Education

In the earlier periods of the movement many writers use the term "industrial education" under conditions that indicate they were thinking of an industrial activity work similar to present-day industrial arts. The United States Bureau of Education make the statement that the term "industrial education" is frequently applied to a variety of forms of practical training.

> Among the forms of so-called practical training to which the term "Industrial Education" is sometimes applied are manual training, sloyd, mechanical drawing, mechanic arts training, printing, book binding, metal work, etc. [212 : 36]

The concept of industrial education today is largely that of training a person for some specific occupation so that he may take his place in industry. A bulletin of the Bureau of Education uses the following definition:

> Vocational industrial education includes those forms of vocational education the direct purpose of each of which is to fit the individual for some pursuit or trade. [212 : 45]

Such a definition of the term "industrial education" was current in the early eighties. Many who were advocating industrial activity work in the schools were thinking of it in this sense.

There was another group, however, who were attaching another

meaning to the term, a group who were thinking of the general educational values of this type of work for the pupil. Felix Adler (1883), writing about the two "distinct meanings" of the term "industrial education" and of the latter interpretation, says,

> There is a totally different sense in which the phrase "Industrial Education" may be understood; not that education shall be made subservient to industrial success, but that the acquisition of industrial skill shall be the means for promoting the general education of the pupil; that the education of the hand shall be more completely and more efficaciously educating the brain. It is in the latter sense, in which labor is regarded as a means of mental development, that industrial education is understood by the most enlightened of its advocates. [41 : 145]

In an address given in 1888, Nicholas Murray Butler was thinking of industrial education in terms of general education and not in terms of specific trade training when he said,

> Industrial education is an education in which the training of the pupils' powers of expression goes on side by side with the training of his receptive faculties, and in which the training of both is based on knowledge of things and not words merely. [144 : 217]

In differentiating between technical education and industrial education, Dr. Butler continues:

> Industrial education . . . is the foundation itself. It is the general and common training which underlies all instruction in particular techniques. [144 : 217]

It is this general educational meaning that the writer has in mind when he makes reference to industrial education in the early development of industrial work in the public schools.

Manual Training

Manual training was the original term under which the industrial activity work was introduced into this country following the Centennial Exposition at Philadelphia in 1876. It was an all-inclusive term, descriptive of the formal hand training of the period which was based on fundamental industrial processes characteristic of the school work for many years after the opening of the first manual training schools.

That manual training held much in common with industrial arts is shown by the following definitions and statements. In 1888 the New Jersey Council of Education reported that

Whereas there are several and conflicting uses of the term manual training be it hereby Resolved, that the New Jersey Council of Education defines manual training as training in thought expression by other means than gesture and verbal language, in such a carefully graded course of study as shall also provide adequate training for the judgment and the executive faculty. This training will necessarily include drawing and constructive work, but experience alone can determine by what special means this instruction can best be given. [233 : 5]

Further along in the report, the following comment is found:

I believe that the term "Manual Training" might be rightly applied to any exercise in which thought is expressed by means of the hand. [233 : 5]

Woodward, in referring to the term "manual training," wrote as follows:

This term, according to the best usage, signifies the systematic study of the theory and use of common tools, and the nature of common materials, elementary and typical processes of construction, and the execution and reading of working drawings. [214 : 1019]

Manual Arts

Bennett, in an editorial in the *Manual Training Magazine* for April 1904, states his belief that manual training, manual arts, and industrial arts are almost identical. On this point he says,

Our observation indicates that representative work being done today under the name "Industrial Arts," or "Practical Arts," is almost identical in content and method with equally representative work under the name of manual training, and likewise with work done in other places under the name "Manual Arts." Any differences are chiefly in the minds of the promoters of the work, not in the work itself. [48 : 307–308]

Manual arts as a term came into use with the change from the emphasis upon the formal hand-skill-producing exercises to an emphasis upon the construction of articles of utilitarian value which involved the use of skill with tools together with some freedom in design. Vaughn and Mays comment as follows:

The term manual arts is an attempt to fit the name to the content rather than to the form of the work. It indicates that those who brought it forward were thinking in terms of the ideas, materials, and practices of at least some of those trades, vocations, or "arts" in which people use the skill of their hands to do the work of the world. [33 : 58]

Bollinger's terminological study analyzed the concepts involved in a number of definitions and as a result he defined "manual arts" as

A term used to describe such objects as woodworking, mechanical drawing, metal work, printing, leather work, jewelry making, clay work, bookbinding, etc., when taught as a form of general education having for its chief purpose that of developing within the pupil, manual skill and an appreciation of good design and construction by practice in a variety of exercises and projects of personal value. [192 : 125]

Industrial Arts

Richards expresses the belief that a large part of the confusion in the field has been due to the fact that the first name given to the industrial activity work was not adequate to express its real purpose and content. He has the feeling that in using the term "manual training" too much emphasis has been placed upon the manipulative phase of the work rather than the content back of the manipulative activity. He writes:

If in lieu of such a phrase as manual training, the term industrial art, for instance, had been used, much of the above confusion and misconception would have been entirely avoided. Such a term clearly indicates a specific body of knowledge as the subject-matter of instruction and at once establishes criteria as to the selection and organization of material and, to a certain extent, definite standards of performance. [100 : 373]

Professor Bonser has contributed extensively to the use and development of the term "industrial arts." In his article, "Fundamental Values in Industrial Arts," he presented a new point of view which has exerted a great influence in bringing about a change from the emphasis on manipulative processes and tool sequences to an emphasis upon valid educational content. [127 : 4–20] In the article referred to above, Professor Bonser gives the following definition:

Industrial Arts, as a school subject, is the distilled experience of man in his resolution of natural materials to his needs, for creature comfort, to the end that he may more richly live his spiritual life. [127 : 20]

The common conception of the meaning of the term industrial arts is derived, to a large extent, from Bonser and Mossman:

The industrial arts are those occupations by which changes are made in the form of materials to increase their values for human usage. As a subject for educative purposes, industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes. [5 : 5]

Professor Bonser expanded the meaning of industrial arts further in an address given before the industrial arts section of the Central Ohio Teachers Association in November 1928. [4 : 95–96]

The committee of the Western Arts Association for "The Terminological Investigation" of which Dr. Warner, of the Ohio State University was chairman, presented the following definition,

Industrial Arts is one of the Practical Arts, a form of general or non-vocational education, which provides learners with experiences, understandings, and appreciations of materials, tools, processes, products *and* of the vocational conditions and requirements incident generally to the manufacturing and mechanical industries. [192 : 122]

Vaughn and Mays imply that the term "industrial arts" is another attempt to give an appropriate name, as a means of promoting a better conception of the content of the industrial activity work which has evolved in the United States "under the old names of manual training and manual arts." [33 : 58–59]

SUMMARY

It would seem that regardless of the term used to identify the work, the central concept has been the study of industries for purposes of general educational values, values that apply in varying degrees for all pupils regardless of what their future occupation may be. There is a growing conviction that industrial insights, appreciations, and experiences may be obtained through school activities of an investigative nature in which hand work is an important and necessary element.

CHAPTER III

INCEPTION OF MANUAL TRAINING

SEVERAL factors appear as precursors of the manual training movement in the United States. Mays, writing on the development of industrial arts in the American school system, says,

> Like all great educational movements, it has its beginnings rooted deep in the vast maze of social, economic, political, and intellectual tendencies and developments. [90 : 43]

Among the immediate causes for the development of industrial arts that he cites is the demand for technical instruction in the schools as a result of the social and economic influence of the fast receding frontier linked with the tremendous expansion of American industry at the close of the first half of the nineteenth century. [90 : 43]

Urbanization

Smith, in an address before the Department of Superintendence in 1879 [207 : 71], and White, in an address before the National Education Association the following year [193 : 222], call attention to the drift of the people from agricultural to mechanical pursuits.

The increasing shift from rural to urban population, combined with the increasing specialization in industry, resulted in bringing forward many advocates who suggested manual education either as a means of training youths for industry or as a means of acquainting them with industrial processes. [208 : ccxxxiv] The argument was advanced that whereas many of these processes were formerly learned in their simpler forms under home and parental guidance, such instruction was no longer possible because of changes in social and economic conditions, and therefore the public school was the natural agency to continue this training through a program of manual education. [191 : 196]

Decline of Apprenticeship

Both Smith and White refer to the consciousness of the public to the decline of the apprenticeship system and a desire on its part for some form of training which would continue to supply the increasing demand for skilled workers. Davis makes the statement that,

> The last fifty years have produced great changes in our social condition. The extensive use of machinery in the mechanical arts, the minute division of labor, and other causes, have abolished the apprenticeship system so general throughout New England in former years. . . . [220 : 121]

Thompson lists the limitation of the number of apprentices by trade unions as another reason for the decay of apprenticeship. [185 : 247] Apgar, in 1879 [196 : 34], and Eliot, in 1880 [326 : 8], and Thompson, in 1881 [185 : 248], refer to the decline of apprenticeship and the need for some kind of training to replace it. All of these men suggest "ingrafting" a course of technical instruction upon the public school curricula. With respect to such instruction, Thompson said,

> We cannot revive apprenticeship if we would, and perhaps we would not if we could. What we purpose to do in the common schools is that we give a technical or practical *tendency* to all our teaching. We would not change the curriculum of studies so much as our methods of instruction. The great substitute for the loss of apprenticeship is education—general education—that which gives quickness to mental perception and skill in the use of the hands. [185 : 248]

Thompson was placing the value of manual training on the conception of formal discipline. Of special interest is that part of his address which shows a vision of a situation which was soon to face a machine civilization:

> Versatility is the great need of the laborer in this age of machinery, so that when some machine is invented that does his work better and more rapidly than he can do it himself, he may be able either to run the machine or turn his attention to something else. A general education such as is given in our common schools and colleges by teachers who understand and insist upon the practical bearings of what they teach, best fits the laborer for turning from one vocation to another. [185 : 248]

Industrial Competition

The element of competition is suggested by Victor Smith as a contributing cause for the manual training movement. He states that "the initial factor in the growth of manual arts in the educational scheme of this country owes its stimulus to a realization of international commercial rivalries." [115 : 360] Anderson makes a similar statement and attributes the introduction of drawing into the public schools to the same stimulus. [1 : 130–132, 156] MacArthur, in 1884, voiced the fear that American industries would fall into the hands of foreigners unless manual training were provided in the public schools. [18 : 280]

Interstate or intersectional rivalry may also have served as a stimulus. In the Report of the Boston School Committee for 1878 appears this statement: "The question of teaching trades in our schools is one of vital importance." [248 : 38] The position New England held in industry is referred to, and the report continues,

> If New England would maintain her place as the great industrial center of the country, she must become to the United States what France is to the rest of Europe,—the first in taste, the first in design, the first in skilled workmanship. She must accustom her children from early youth to the use of tools, and give them a thorough training in the mechanic arts. [248 : 38]

Although there may well be some question as to the influence of sectionalism, nevertheless the quotation cited does show a sensitivity on the part of certain public officials to a fundamental problem facing them.

Smith also advances the idea that the world expositions, held in London in 1851, in Paris in 1867, and in Philadelphia in 1876, served to stimulate interest in manual training as an outgrowth of industrial rivalry. [115 : 360]

Political Thought, Equality of Opportunity

Mays gives credit to the political and social thought of the nineteenth century as playing a significant part in preparing the ground for the industrial arts. He states that the effect of the French Revolution had extended to America with a consequent emphasis upon equality of opportunity in the social organization. Because of this

fact, it was not surprising to find among educational leaders some who advocated a new education more suited for pupils who would need to become wage earners at an early age. [90 : 43] Royce makes the statement that "every boy, rich or poor, is, we think, as much entitled to be taught a good trade as to have an education in our public schools." [23 : 497] Thompson expressed the opinion "that if the common-school studies and methods are especially adapted to any class of people, it ought to be the working classes." [186 : 219] Walter Smith would have the "elements of industrial knowledge and skill" introduced "into the public schools in such a manner that it would assist and not obstruct general education. . . ." [207 : 72] Inasmuch as he felt the mechanics to be the most neglected of all groups, he further proposed a system of evening schools where the worker might improve himself in his line of activity after he had left the grammar school to become a wage earner. Leipziger also looked upon the manual training idea as a natural development of the social and industrial conditions of the time. [164 : 439] Somewhat earlier, in 1890, Leipziger stated that manual training had come forward as a result of the wave of naturalism which had spread in influence following the teachings of Comenius, and as a result of the advances in the field of science. [235 : 58–62]

Criticism of Schools

Richards, in an article written for the *Cyclopedia of Education* said,

> In the United States, manual training came into being partly as the expression of a new educational philosophy and partly from dissatisfaction on the part of the public with the results of the purely bookish curriculum of the schools. [20 : 125]

Sears, in his study, also cites two of the factors already mentioned: the demand for a liberalized school curriculum and the demand for industrial training. [25 : 116] Philbrick reports that "many thoughtful and philanthropic persons in the community are beginning to feel that we are concentrating our efforts too exclusively upon intellectual instruction." [219 : 260]

Among the educational leaders who criticized the "bookishness"

of the schools and favored the inclusion of some form of practical work to prepare pupils for a livelihood are J. P. Wickersham [237 : xxx] and S. R. Thompson. [186 : 219] Runkle calls attention to the "growing feeling that our public education should touch practical life in a larger number of points." [221 : 187] The "Prospectus of the Manual Training School of Washington University" expresses the belief that the curriculum of the established schools is not broad enough to meet the future needs of the pupils. The statement is made that

> This conviction of the present means and methods of education has found utterance in many ways. Some of the best friends of education have expressed themselves in strong and suggestive language, all such agreeing in the conclusion that the main deficiency is in the direction of manual education. [339 : 7–8]

In the last-mentioned statement, the reader must make allowance for the fact that the founders were attempting to justify the establishment of a manual training school. Attention can be directed to articles by Dutton [288 : 39], Magoun [166 : 494], Ham [11 : 13], MacAlister [165 : 35], Clarke [198 : 1] and Woodward [215 : 879], which refer to the tendency of the public schools to deal too exclusively with the abstract and theoretical in education.

Two other criticisms of the public schools are to be noted in the early eighties. The first is the belief that too many pupils were being educated for the commercial and professional pursuits to the neglect of the industrial occupations where so many of them would have to take their place as a means of earning a livelihood. [326 : 8; 146 : 184; 71 : 941] The second criticism was that the type of education being offered in the schools was of such a nature that it was educating youth to "false ideas of social ambition" so that they considered hand labor to be beneath their dignity as "gentlemen." [326 : 8; 71 : 941]

Manual Labor Movement

The manual labor movement bears a striking though superficial resemblance to the manual training movement. This former movement began in the early twenties and was chiefly an outgrowth of the

work of Fellenberg. [20 : 123] Although there is some question as to the primary purpose of the shopwork practiced in the several institutions organized on this plan, nevertheless some attempt was made "to unite training in agricultural and mechanical pursuits with the ordinary school studies." [20 : 123] This movement may be said to have served a purpose in calling attention to the need of a more liberal education suited to all people rather than to a privileged few. The article in the *Cyclopedia of Education* implies a closer relationship between the manual labor movement and the manual training movement than Anderson [42 : 369] would infer. It mentions the abandonment of the manual labor feature around 1840, and contains the statement that "the manual training movement in the United States was deferred for half a century." [20 : 124]

Land-Grant Colleges

The organization of the land-grant colleges appears as another contributing factor to aid the manual training movement. The growth of these colleges, bringing with it a consequent increase in the number of teachers devoting full time to industrial education, served to stimulate a general interest in the problems relating to the field of industrial training. [90 : 44] Referring to the Morrill or Land Grant Act of 1862, *The Report of the Commission on Industrial Education to the Legislature of Pennsylvania* states that

> Not the least important service conferred upon the people of the country by the act of congress just mentioned has been the creation of a large body of men engaged in teaching and popularizing modern science, and especially manual training in connection with agriculture and the mechanic arts. Their influence in this respect has already been felt and promises to be still more so in the movement for popularizing manual training as a part of public school instruction. [236 : 8]

Hoitt also gives the same point of view with reference to the effect of the land-grant colleges upon manual training. He says,

> The influence of these colleges, their direct connection, in many cases with the public schools, and the able body of scientific teachers employed by them, has had the effect of making more popular the idea of manual training in connection with our public schools. [217 : 33]

Faculty Psychology

The so-called faculty psychology so prevalent during the eighties [94 : 181] apparently was another strong factor in introducing manual training into the curriculum of the public schools. According to this psychology, fixed areas of the brain governed certain faculties and unless these faculties were trained, the brain could not be fully developed. Furthermore, if all areas of the brain were not properly developed the individual would not be a well-balanced person. [176 : 678] Because of this theory, many leaders advocated the use of hand training to round out the education of youths and to supplement the seeming deficiencies of intellectual training. The result was that attention was diverted by educators from the practical benefits of handwork to the subtler cultural aspects of the work. [154 : 1; 165 : 35–36] Richards says,

> The first serious agitation for the inclusion of industrial education in the public schools was, naturally enough, when the prevalent attitude of the school men is considered, not for real vocational training, but for the inclusion of manual work in the general course of study as an element of culture and general efficiency. [176 : 677]

The literature of the period reveals many articles and discussions on the interrelation of the mind and the hand, as well as the coördination of the intellectual and the physical. According to Leavitt,

> The result of this discussion was to establish the claim that manual training had a distinct cultural value, and it was because of the general acceptance of this proposition by educators that the new form of educational activity was so speedily and generally established. [15 : 13]

THE NEW YORK INDUSTRIAL EDUCATION ASSOCIATION AND TEACHERS COLLEGE

Grace Dodge, in *A Brief Sketch of the Early History of Teachers College*, traces the history of that institution back to the founding of the Kitchen Garden Association by eleven young women in April 1880, for the purpose of promoting a modified form of kindergarten work. By the end of the fourth year a feeling had developed that the Association should undertake "new and enlarged work," and a meeting was called for March 21, 1884, at which time the Kitchen

Garden Association was dissolved and the Industrial Education Association took its place.

The objects of this Association as stated in the by-laws published in the first annual report of the Association were:

First. To obtain and disseminate information upon Industrial Education, and to stimulate public opinion in its favor.

Second. To invite co-operation between existing organizations engaged in any form of industrial training.

Third. To train women and girls in domestic economy and to promote the training of both sexes in such industries as shall enable those trained to become self-supporting.

Fourth. To study and devise methods and systems of industrial training and secure their introduction into schools; also, when expedient, to form special classes and schools for such instruction.

Fifth. To provide instructors for schools and classes, and, if necessary, to train teachers for this work.

The annual reports of the Association for the next few years show what an active part this organization took in furthering the spread of industrial education through the distribution of literature on the subject; through experiments with practical arts courses in day, evening, and vacation schools; through supplying teachers, not only in New York City and the immediate area but to points as far distant as Cleveland, Ohio. C. E. Meleney writes,

> The establishment of the Industrial Education Association in New York and the founding of the Manual Training School at No. 9 University Place . . . had a wide influence in that part of the country. [239 : 219]

One result of the Association's activities in promoting the introduction of industrial handwork into public and private schools was that a demand was created for trained teachers in the work. In January 1889 a provisional charter was granted by the Board of Regents and the name of the corporation was changed to the New York College for the Training of Teachers. In December 1892 a permanent charter was granted to Teachers College, Columbia University. Anderson, in commenting on this school, says,

> Throughout the successive stages of its extraordinary growth Teachers College has remained true to the purpose of its founders. It has throughout

exerted a powerful influence in the promotion of manual and industrial training in the schools of the country. [1 : 169]

SUMMARY

From the foregoing it is evident that much of the early public support of the manual training movement was due to a vague but sincere conviction that the introduction of handwork would serve as a substitute for apprenticeship and provide a form of industrial training to care for the increasing demand for mechanics regardless of trades or occupations. The failure of the apprenticeship system stimulated an interest in manual education and the movement was further aided or influenced by the manual labor movement, the organization of the land-grant colleges, and the criticism of the academic tendencies of the period. The acceptance of manual training by educators, as possessing distinct merit in keeping with the conception of formal discipline, was a still greater factor in instituting manual training as a subject in the public schools.

CHAPTER IV

PRIVATE MANUAL TRAINING SCHOOLS
PIONEER PERIOD, 1871–1884

THE beginning of manual training in the United States is thought of as dating from the time that Professor Runkle discovered the Russian exhibit of handwork displayed on an obscure stairway at the Centennial Exposition in Philadelphia in 1876. This exhibit proved to be the answer to the problem confronting him, and in the same year he proceeded to develop the Russian system of work in the shops of the Massachusetts Institute of Technology as a means of giving training to prospective engineers. Three years later, in 1879, Calvin Woodward organized the Manual Training School of Washington University in St. Louis, Missouri. In this school, probably better known as the St. Louis Manual Training School, he made manual education a definite part of the school program. Although both of these experiments did much to influence the spread of manual training, there had been some earlier attempts in this country to create an interest in handwork, some of which were later to be influential in getting a similar type of work started in the public schools.

BOSTON WHITTLING SCHOOL

Among the earlier experiments was the Boston Whittling School which had its inception in the Hollis Street Church of that city under the charge of Frank Rowell in 1871.

Purpose

The purpose of the school, if judged on the basis of a letter which Cheney wrote as a report to the Rhode Island Committee on Education, was to give pupils an enjoyable type of craftwork in which they might normally engage. An extract from the letter states:

Our "whittling school" has opened its jack-knife every winter for five years. Thirty or forty boys from twelve to sixteen years of age have belonged to it, and with the aid of jig-saws, a turning lathe and a few simple tools, they have made brackets, match-boxes, small chests, checker boards, and such trifling things. We have accommodated the school in our chapel, and found no difficulty in accomplishing the little thus described with portable work-benches, etc. The value of such a school is not so much in the amount of skill the boys attain to, but in the bent it gives their taste, and in the innocent enjoyment it gives to their leisure hours. [238 : 28]

The report of 1876–1877 also recognized the handwork of youth as a normal activity. Referring to the course of twenty-four lessons in woodcarving, the report states:

It was not designed to make finished workmen in wood-carving, but to take advantage of the natural inclination towards handicraft,—the Yankee taste for whittling which belongs to most boys, and to develop it and guide it to useful application. [221 : 194–195]

It is apparent that the value of the training was considered to rest in the activity and not in the tool process and so the fundamental principle in the early stage of the Boston Whittling School bears a distinct likeness to an educational philosophy that was later to be advocated.

INDUSTRIAL SCHOOL ASSOCIATION

Another experiment in handwork started in Boston in 1874. During the year 1876–1877, the two organizations joined to form the Industrial Schools with the Reverend George L. Cheney as president. Two practical woodcarvers were employed as teachers and they held classes two evenings a week from seven to nine o'clock. The class was made up of thirty-two boys from twelve to sixteen years of age. About half of these boys were attending day school, while the remainder of the group were working in various occupations. The course consisted of a series of twenty-four graded exercises, no specific articles of utility being made in the school. The expectation was that in carving the twenty-four white wood blocks with such tools as a flat chisel, a gouge, and a veining tool, a knowledge of the use of tools would be built up.

Purpose

It is somewhat difficult to accord the stated object of the school with the limited range of work that was attempted. It is quoted here because it is a prototype of many later statements made by schools that incorporated the Russian system of manual education and because it reflects the theory of transfer of training prevalent in those days:

> The object of the school was not to educate cabinet makers or artisans of any specific name, but to give the boys an acquaintance with certain manipulations which would be equally useful in many different trades. *Instruction,* not *construction,* was the purpose of the school. [221 : 195]

The following year the policy of the Industrial School Association was changed so as to give instruction in the common woodworking tools instead of in the use of carving tools that formerly had been taught. Two factors seem to have influenced their decision: The first was the conviction of the importance of manual training and the desire to make it a part of public school instruction; the second was the constantly increasing number of persons who were using such tools. The Association determined to test the Russian system of shopwork whereby "the students are taught in classes, rendering it unnecessary to give any individual instruction except that which is demanded by individual peculiarities of temperament. . . ." [221 : 220] Although the Association was interested in the use of the Russian system, it is implied in the above statement that even in the early beginnings of the movement, they were aware of individual differences to a limited extent.

Development of a Textbook

An interesting development of this experiment was the use of a textbook. The statement of the Association was that if the Russian system "is to have any extended application, everything must be done to make such instruction easy and efficient." [221 : 220] The Association believed this could be best effected through a text which showed every detail essential to the best performance of each manipulation. A committee was authorized to employ the best sources available in the preparation of such a manual. Later, William Ware,

in making his report as chairman of the committee, gives credit to no less than thirteen persons as having made important contributions. [34 : v–vi] The original intention of the Association was to have the committee engage certain "specialists" who were first to prepare and then revise a series of primary lessons in the use of woodworking hand tools, to be followed by a similar series of more advanced lessons in application of these tools to the production of typical forms in carpentry and joinery. [221 : 220]

According to Ware, the primary lessons were prepared by Channing Whitaker and Raymond Chapell with the assistance of Alonza Folsom in the winter of 1877–1878. These lessons were used by Chapell while he was teaching in the Church Street School maintained by the Association, and in the School of Mechanic Arts. The first lesson was printed as a circular for general distribution to illustrate the work of the school, and it attracted much attention. It proved of such general interest at the time that it was later printed in *The Polytechnic Review*, of Philadelphia, and in the *Forty-First Annual Report of the Massachusetts Board of Education* for 1876–1877. [34 : vi]

This lesson appears to be a forerunner of the present-day job sheets, which still retain such characteristics as separate headings for materials, the arrangement of sequences by definite steps with careful directions for using tools and the cautions to be observed. There seems to have been little thinking and planning left for the pupil to do. His activity consisted principally in reading and practicing the directions given.

The course set up by the Association was built around a series of exercises in the use of tools, and the original plan of the Association was to prepare a detailed lesson for each exercise in the course. The report indicates that eleven of these lessons were prepared and then presented in the school maintained by the Association before the plan was changed. Ware comments to the effect that after the first lessons were prepared

> it became evident that so explicit and complete a work as was first contemplated would occupy too much time in preparation, and, when done, might be too large and costly to meet the ends that the association had chiefly in view. It therefore was decided to use only those portions of

the manuscript which would be suitable in the preparation of a textbook that would provide sufficient guidance to woodworking classes without going so thoroughly into detail matters of procedure. [34 : vii]

The result was that the material was condensed into a textbook of 102 pages, including many illustrations.

SCHOOL OF MECHANIC ARTS

Although there were several early attempts by individuals and private organizations to effect an interest in manual education, Anderson gives Runkle credit for bringing about the manual training movement. [1 : 161]

Professor Runkle had noted the development of laboratory work in chemistry, and since he was interested in discovering an efficient means of giving engineering students training in shop practices, he conceived the idea that perhaps in the engineering field the laboratory could well be used as a class method of instruction. It was with this thought in mind that he went to the Centennial Exposition in Philadelphia in 1876 where he sought to find out what experiments in the laboratory method for engineering shopwork other schools were trying out. That he was successful in his quest is evident in his report to the Corporation of the Massachusetts Institute of Technology:

> It gives me the greatest pleasure to call your attention to the exhibit made by the Imperial Technical Schools of St. Petersburg and Moscow, consisting entirely of collections of tools, and samples of shop-work by students illustrating the system which made this result possible. [329 : 126]

Purpose

The School of Mechanic Arts was founded by a vote of the Corporation of the Institute, August 17, 1876. [223 : 146] It is quite apparent that the school was established for the primary purpose of providing shops and equipment for the engineering students attending the School of Industrial Science. The Corporation of the Institute was unable, at this time, to furnish these training facilities and establishing the School of Mechanic Arts was one solution to the problem. [181 : 133] Francis Parker points out a second aim

for the establishment of this school. The purpose was to set an example of instruction in the mechanic arts in high schools and thereby promote a new kind of education in schools of this class throughout the country. [332 : 29] The establishment of a subsidiary school of less than college grade may have been influenced somewhat by the financial assistance given the Institute at this time by the Massachusetts Charitable Mechanics Association. [180 : xx]

In the *Twelfth Annual Catalogue* is found the following statement regarding the "New Department of Practical Mechanism":

> A series of shops have been provided for teaching the students in the department of Mechanical Engineering the use of tools in wood and iron work by the class system, a two years course in Practical Mechanism has also been established for those who wish to become Master Mechanics rather than engineers, and, especially for the large class of pupils to whom such a systematic training will prove a valuable foundation for the engineering or other scientific study. [333 : 21]

On the same page is also found the sentence, "This course constitutes a thorough preparation for admission to all the other courses of instruction in the Institute." From the foregoing, it is evident that the Corporation of the Institute was governed by two major objectives in the same institution: one, to continue the aims of the older established school and the other, to use the curriculum of the new school for properly preparing any student who might wish to continue his studies into the higher schools of the Institute.

The latter plan did not materialize. In the first place, there were so few students entering the school who wished to continue their studies compared with the large numbers who had no interest in extended engineering courses but who did desire to prepare for entering upon some industrial occupation in the shortest time possible, that it was decided to develop the school in the interests of these latter students. [221 : 192; 330 : xi, 28] Thus, the *Thirteenth Annual Catalogue* shows a change in the name of the school and in its function:

> A School of Mechanic Arts, in which special prominence is given to *manual* instruction, has been established for those who wish to enter upon industrial pursuits, rather than to become scientific engineers. This

school is designed to afford such students as have completed the ordinary grammar school courses, an opportunity to continue the elementary scientific and literary studies, together with mechanical and free hand drawing, while receiving theoretical and practical instruction in the use of the typical hand and machine tools for working in iron and wood. [334 : 61]

Entrance Requirements

The requirements for entering the course were that the applicant must be at least fifteen years of age and he must have satisfactorily passed an examination in eight grammar school subjects. [333 : 21]

Course of Study

According to the course of study established, twelve hours each week were to be devoted to shopwork during the entire two years of the course. Mechanical drawing was to be taught three hours each week during the first year, and six hours a week during the second year. The remainder of the time was set apart for algebra, plane and solid geometry, rhetoric and composition, English literature and French. [221 : 22]

Types of Shopwork

The plan of organization called for instruction in seven shop courses: carpentry and joinery, woodturning, pattern-making, vise-work, forging, foundry-work, and machine tool work. [221 : 196] The first course in vise-work consisted of thirty lessons which included exercises in chipping, filing, and sawing. No exercise appears to have had any value from the standpoint of utility when it was completed. [221 : 197] The second course in vise-work included ten additional processes. Although Wallburg had organized this course, it had not been tried out when the report was made to the Massachusetts Board of Education. [221 : 212]

Two other shops in metalwork were ready for operation during the first year of the institution's existence. The course in forging was built up following an analysis of the trade in which the art was reduced to eight elementary processes. [221 : 213] Some time later three other elementary processes were added to the list. [223 : 159] Fifty-two "forms" were designed to involve the application of these

eleven processes. Of the fifty-two forms, approximately eight resulted in a useful product, the remaining number serving only the purpose of developing the students' skill in the art. [221 : 213] The foundry was another metalworking shop that was in operation the first year. The woodworking and machine-tool shops were not ready for operation until the second term.

A few years after the inception of the School of Mechanic Arts, Runkle, in a report on the institution, said:

> While adhering to the spirit and method of instruction, the aim has been to make the work in all departments as practical as possible, by selecting useful forms, if equally good, to teach the particular manipulation. [223 : 145]

It would seem as though there was a dearth of these "useful forms equally good" for the purpose in view. Of the fourteen "elements" listed for the exercises in the use of the plane and the saw, only one has any utilitarian value and even that is questionable from the standpoint of being practical. [223 : 148–151] Eleven of the elements were exercises in making joints. The same criticism can be made of the other courses for they seem largely to have retained the same method of instruction in tool manipulation by means of a series of exercises. [223 : 151–170]

Method

The method of instruction was based on the Russian system consisting of the use of selected tools and appliances which were to be taught by means of a series of progressive lessons involving a sequence of exercises. In the *Twelfth Annual Catalogue* of the institution is found the statement:

> The shopwork is strictly unique, there being so far as it is known, no other school for metal working conducted on the same plan, except in Russia. [333 : 21]

In the catalogue of the following year this statement is somewhat modified to read:

> The shop-work is unique, being based upon the art and not the trade, and conducted upon a plan designed at the Imperial Technical School of Moscow, Russia, and carried on there with most satisfactory results.

Apparently the system was meeting all expectations, for the catalogue continues:

> It has, indeed, proved a most efficient substitute for the apprenticeship system, which is fast becoming obsolete; while by its thoroughly progressive and systematic method, it has proved a valuable educational element. [334 : 61]

Throughout the life of the school, from its inception in 1876 to its close in 1889, the Russian system remained the plan of instruction. Runkle succinctly states its objectives as follows:

> The ideas involved in this system are, first, to entirely separate *art* from the *trade*,—the *instruction* shops from the *construction* shops; second, to teach each art in its own shop; third, to equip each shop with as many places and sets of tools, and thus accommodate as many pupils as the teacher can instruct at the same time; fourth, to design and graduate the series of samples to be worked out in each shop on educational grounds; and fifth, to adopt the proper proficiency and progress. [223 : 134]

The Russian system of shopwork described by Runkle was based on the assumption that every construction was composed of a number of fundamental elements or "forms." These elements could be classified in accordance with processes involved and tools used in "working them out." The theory was that in teaching the pupil how to perform the various processes with the tools best adapted to the work, he would thereby become versed in the fundamental skills of shopwork and be ready to take his place in the construction shop and later in manual occupations. The position was taken that it was necessary to make an analysis of the trade and to abstract all of the elements which were then to be arranged in a graded series and taught as exercises to be performed in a required sequence. It is to be noted that according to this system there was a sharp distinction between instruction and construction. Instruction in the various operations and tool processes was to take place in a unit shop designed for that particular type of work. Not until the pupil had passed through the series of unit shops available in the institution and had completed the required exercises was he allowed to enter a construction shop where he might make an article of utility. [329 : 126–127]

According to Runkle, no allowance was made for any previous experience or training which the pupil may have had. The system presupposed the pupil's ignorance and began at the foundation, both in theory and practice. That he had confidence in the outcome of the series of exercises made by the pupil is implied when he writes: "Every step well taken from such a beginning is a clear gain, and the successive steps have only to be taken to arrive at the goal of success." [329 : 142]

Foley, in a report to Runkle, gives his method of teaching forging. The first step was to place a sketch of the object to be made on the blackboard, with all necessary working dimensions. The making of the object was then demonstrated by the instructor before the assembled class. During the process, he attempted to point out all difficulties which might prevent the student from being successful in his own work. As a further aid, models of the object were placed about the room for reference whenever needed. The last step was to judge and grade the work according to a schedule that had previously been set up. [223 : 159]

Grading

A series of inspections were set up for an aid in grading, a percentage of the rank being apportioned to each detail so that the student received credit for that part of the work correctly completed. [221 : 199] Professor Runkle emphasizes the importance of this inspection system because of two values. He saw them as a means of determining the progress of the student and as a means of cultivating the powers of judgment. [221 : 198] The powers of judgment, he placed in a position of first importance.

Runkle's Philosophy of Mechanic Arts Work

Runkle did not favor trade schools except in a few special cases. While he was interested in disseminating industrial knowledge, he felt it should be done in the schools through the mechanic arts courses where the students were to be taught those fundamental elements underlying all industrial pursuits. To him, mechanic arts instruction was a necessity in the life of the student in order that he might better round out his general education. [223 : 133] In

speaking of mechanic arts in an address at Boston in 1884, Runkle is quoted as saying,

> It had caused new and profound attention to be given to the subject of our public education, raising the question whether it is not too subjective to be most effective, either as an end or as a means of preparation for the common duties of life. [180 : xx]

As late as 1891, he had modified his faith in the system very little. In an address given in Boston that year he stated:

> While instruction in the mechanic arts does not constitute the whole of industrial training, it is yet so fundamental and so large a factor in all such education that we may well regard it as the corner-stone of the structure, or the key-stone of the arch. [181 : 130]

MANUAL TRAINING SCHOOL OF WASHINGTON UNIVERSITY

The next educational experiment along the line of secondary school industrial arts developed in the Manual Training School of Washington University. Although some form of shopwork had been provided for the engineering students of the university since 1872, with the establishment of the Manual Training School, June 6, 1879 [335 : 3,5; 36 : 3,5] provision was made for "instruction in Mathematics, Drawing, and the English branches of a high school course, and instruction and practice in the use of tools." [339 : 5] According to the announcement in the catalogue of the school, tool instruction was to include

> Carpentry, Woodturning, Pattern Making; Iron Clipping [*sic*] and Filing; Forge Work, Brazing, and Soldering, and the use of Machine Tools, and such instruction of a similar character as it may be deemed advisable to add from time to time. [339 : 5]

The practical element thus introduced into the curriculum may have been, in part, an outgrowth of the training and experience of three of the founders of the institution, Gottlieb Conzelman, Edwin Harrison, and Samuel Cupples. [199 : 16–17] The "definite impulse" that later resulted in the establishment of the Manual Training School is traced by Coates to a speech delivered by Woodward on May 16, 1878, before the St. Louis Social Science Association. [199 : 16] Coates attributes the interest of these three men in

manual training entirely to the efforts and speeches of Woodward. [199 : 16] In turn, it might seem reasonable to assume that these three practical businessmen exerted an influence upon Woodward in determining the policies of the school. At least later developments in the school would seem to bear out this assumption.

With the establishment of the Manual Training School under the leadership of Woodward, the manual training school "movement was given its American name, form and significance as a means of general secondary education." [203 : 215] Woodward was the first to use the name for this particular form of education and it was he who, in the early days of manual training, was one of its most ardent advocates in the field; in fact, at times it seemed as though he almost stood alone in this respect. [203 : 215]

Purpose

Several factors appear to have influenced the founding of the school. In the first catalogue is found this announcement:

> The Manual Training School owes its existence to the conviction, on the part of its founders, that the interests of St. Louis demand for young men a system of education which shall fit them for the actual duties of life in a more direct and positive manner than is done in the ordinary American school. [339 : 7]

This implied protest against the type of education common to the period was probably affected by the industrial expansion taking place at that time. Three of the founders, who have already been mentioned, were merchants and manufacturers who had hopes of developing an education that would result in economic efficiency. These men were evidently thinking of a school to fit boys to take positions in manufacturing establishments as skilled workmen and foremen. [339 : 7] Nor was this fundamental idea of the development of an industrial intelligence confined to these three practical men. Chancellor Eliot said during an address:

> The school has 100 workmen busily engaged in acquiring the elements of a sound mental education at the same time with practical training in the use of tools, to fit them for the intelligent application of skilled labor in whatever direction that growing industries of manufactories and workshops may require. [327 : 2]

Although Professor Woodward, as director of the school, often emphasized in his numerous speeches and written articles that it was not the purpose of the school to teach a trade, he was equally emphatic in asserting that such a system of tool instruction as he advocated would teach all the essential principles underlying the trades, thereby enabling the student, upon graduation, to quickly adjust himself to any of the many trades. [35 : 61; 125 : 347–357]

Another object of the school was "to foster a higher appreciation of the value and dignity of intelligent labor, and the worth and respectability of laboring men." [339 : 10] The belief was that through the experiences of working with tools and materials in the shops of the school the student learned to appreciate the skills involved in handicraft and thereby developed a greater respect and sympathy for workmen.

In an article on the early history of the institution written nearly a quarter of a century after the school had been established, Woodward says,

> The object of the school was threefold: (1) To furnish a more appropriate foundation for higher technical education; (2) to serve as a developing school where pupils could discover their inborn capacities and aptitudes; (3) to furnish those who look forward to industrial life opportunity to become familiar with tools, materials, methods of construction, and exact drawing. [213 : 983]

According to the study made by Coates, the first object was accomplished with satisfactory results. [199 : 74] An examination of the lists of graduates in the various catalogues and other published lists would tend to verify this conclusion.

Although the second object, or guidance objective, is brought out in the prospectus of 1882–1883 and in the catalogue of 1883–1884 [340 : 6–7; 338 : 143], there is nothing in the later literature to indicate any concentrated effort to attain this objective. Since a somewhat similar outcome is usually included in numerous lists of objectives for shopwork in industrial arts today, the following extract from the catalogue is quoted:

> It is confidently believed that the development of this school will prevent those serious errors in the CHOICE OF A VOCATION which often prove fatal to the fondest hopes. [338 : 143]

Following this quotation, some space is devoted to showing the advantage of this type of educational activity as negative guidance as well as positive guidance. Apparently the board of the institution had great faith that the type of work offered had value for all students regardless of any future occupation they might enter. [338 : 144] The third object mentioned by Woodward is one which has received a large amount of attention in his writing and in other literature connected with the school.

Plan of Instruction

The method of arranging the shop courses of study shows that Woodward was well versed in the Russian system. The following announcement in the catalogue of 1880–1881 bears a close resemblance to a previous report of Runkle's.

> We abstract all the mechanical processes and manual arts and typical tools of the trades and occupations of men, arrange a systematic course of instruction in the same, and then incorporate it into our system of education. Thus without teaching any trade we teach the essential mechanical principles of all. [336 : 56; 329 : 126]

Such a circumstance might well be expected for, as Coates points out, Woodward was a native of New England and familiar with the descriptions of the Boston Whittling School. [199 : 49] Moreover, he was familiar with the descriptions of educational exhibitions on manual education, particularly those prepared by the several committees appointed by the state boards of education in Massachusetts, Pennsylvania, and Rhode Island on the European exhibits at the Philadelphia Centennial. Although Coates mentions the report of Wickersham, it is to the reports of the Rhode Island committee and to those of Runkle that he gives the most credit for having an influence on Woodward in determining the method of instruction in the school. [199 : 55] Woodward obviously had been faced with problems in the Polytechnic School of Washington University analogous to the problems Runkle had faced in the engineering school of the Massachusetts Institute of Technology. Another document referred to by Coates as having influenced Woodward was the report of a committee appointed by the American Social Science Associa-

tion on a proposed "developing school" in Boston. [199 : 53] This report urged vocational guidance, prevocational training, and the establishment of state-supported trades schools to take the place of the apprenticeship system. [179 : 2–8]

Although the plan of the Manual Training School was somewhat similar to that of the School of Mechanic Arts, there were some marked differences. In the organization of the school are to be found three distinct features: the age for entering was reduced to fourteen years, the length of the course extended to three years, and the time was to be divided "as nearly as possible, between mental and manual labor." [339 : 12]

Course of Study

The sequence of shop courses offered was carpentry and joinery, woodcarving and woodturning during the first year; chipping, filing, and blacksmithing in the second year; study of the steam engine, use of machine tools, and the execution of some project in the third year. Throughout the entire three-year course of instruction, emphasis was placed upon freehand and mechanical drawing. The sentiment of the school administrators was that these latter subjects constituted a "universal language" which every man should be able to read and understand. [36 : 12]

Principles of Teaching

To Woodward, all teaching, to be teaching, must be orderly and systematic. The pupils should not be left to find out methods or use of tools for themselves but "in general they should be taught the right way from the start. . . ." [36 : 30] With respect to this belief he further states,

> One hour of correct *doing* under the eye and direction of a teacher is worth more than months of mere criticism, and crude attempts to find the Correct Way by the Broad Road of Error. [36 : 76]

He could not conceive of school shopwork being treated other than in a formal manner. To be manual training, the work must have system and continuity. For that reason he was very much opposed to a freedom of choice on the part of the pupil. To him the

pupil was a novice and therefore could have "no mechanical ideas worthy of consideration." [214 : 1024] Woodward further criticizes the freedom of activity on the part of the pupil by stating,

> The greatest danger . . . arises from faulty methods of teaching, or rather, no teaching at all. I can not too strongly condemn the wishy-washy tinkering with tools and materials, where the child is the victim of his own whims and of his teacher's ignorance, where, under the pretense of developing originality, initiative, altruism or concrete expression, the child is prematurely misled, misdirected, neglected and mistreated until the possibility of well-timed and well-regulated manual training is lost. [214 : 1041]

It is evident that the purposive, self-reliant pupil work, typical of the avocational pursuits of the pupils in many schools of today was known by Woodward or anticipated by him. Obviously Woodward continued to believe in the formal methods of teaching manual training in spite of a changing philosophy of education. Any other methods, in his opinion, resulted only in the wasting of pupil time, material, damage to tools and, most serious of all, the loss of interest in the work on the part of the pupil. [214 : 1041]

Methods

The reports on the methods of the work taught are rather meager in the catalogue of 1880–1881. Although nothing definite is stated, it is likely that the experiments mentioned refer to the working out of a series of exercises. [336 : 55–57] A catalogue of the following year carries the announcement:

> . . . the shop training is gained by regular and carefully graded lessons designed to cover as much ground as possible, and to teach thoroughly the uses of ordinary tools. [337 : 60]

An announcement in the same catalogue draws an analogy between the application of the educational idea in mechanic arts and of the same idea to chemistry and physics. The statement reads:

> In each the use of apparatus and the treatment of material is taught by systematic experiments in suitable laboratories. In each, everything is arranged for the use of giving instruction in the principles involved, and for acquiring skill in manipulation. . . . [337 : 58]

Somewhat further along is found a statement which appears to have set a pattern for numerous school reports on manual training. It runs as follows:

> The shop instruction is given similarly to laboratory lectures. The instructor at the bench, machine, forge, or anvil, executes in the presence of the class the day's lesson, giving all needed instruction and illustrations. The pupils take notes and sketches as necessary, and questions are asked and answered that all obscurities may be removed. The class then proceeds to the execution of the task, leaving the instructor to give additional help to such as need it. At a specified time that lesson ceases and the work is brought in, commented on, and marked. [337 : 60–61]

The reader will recognize certain methods, teaching devices, and practices that are in common usage today in industrial arts work. Although the author does not give the method a name, it is obvious that he is referring to the demonstration.

Demonstration

Woodward was very much in favor of the demonstration as a means of teaching correct tool and operation procedures. He believed, "In general the teacher should execute all typical exercises anew for each division, and in its presence employ just the method and order he wishes his pupils to follow." [36 : 31] In order that the tool and the method of using it should be fully understood, both were to be fully explained and demonstrated. [36 : 30] The pupils were to be shown each new process as it arose in the working of their exercises rather than allowed to experiment and find their own way out of a difficulty. [35 : 87] The method of doing a piece of work was all-important. While allowing for the several factors influencing methods of using tools, such as materials, pupil age, and ability to interpret working drawings, nevertheless it was implied that there was one best method which should be practiced by all. [337 : 62]

Illustrative Devices

Illustration in the form of large models or drawings to be used in showing the nature of files is mentioned in the catalogue for 1882–1883. [340 : 16] The device of making clay models as a means of

translating the drawing into concrete form as an aid in interpretation is suggested. Just how this suggestion squares with one of the stated objects of drawing, "to increase the powers of visualization," leaves room for comment. [36 : 18]

Textbooks

Textbooks were not used in the shop classes during the first few years of the school's existence [337 : 61]; in fact, the writer found no reference to them during the first decade of the life of the institution. Some form of lesson sheet or job sheet, however, is reported in the catalogue for 1883–1884 as a means of helping the pupil to recall the details of instruction between the time of the class demonstration and such time as he had occasion to use such information. [338 : 33]

Excursions

Another teaching device is brought out as having been introduced into the school in May 1884. At this time, the members of the third-year class, under the direction of several teachers, visited the car shops at Pullman, Illinois, and various industries located in the vicinity of Chicago. [199 : 30] Excursions had previously been conducted by the Polytechnic School, but this was the first time such a method of instruction had been made use of in the Manual Training School. [199 : 43–44]

Examinations

Woodward was familiar with oral and written examinations. To what extent they functioned in the Manual Training School is problematical. "Occasional written examinations," writes Woodward, "are very desirable in the interest of correct vocabulary, precision of statement, and attention of details." [36 : 52]

Exercise Method

The abstract exercises were looked upon as the proper means of instruction in shopwork, and only exercises should be used for manipulative work during the regular period. The point of view was taken that the scope of a trade was too narrow for educational

purposes. [337 : 56] The purpose of shopwork was to be "*in*struction rather than *con*struction." This reason added to the failure of a production basis apprenticeship system brought any plan into educational disrepute if it dealt with finished products. This forced the emphasis upon exercises. [337 : 59; 336 : 56] Woodward advocated the introduction of about one exercise in every three lessons. This he considered sufficient new material for a boy fifteen years old. [36 : 33] He further admonished the teacher to ". . . give no exercise to the class which he has not first done himself." [36 : 18]

Most of the exercises appear to have been typical of processes in the several trades represented, although some of the joints in carpentry appear somewhat extraordinary. The pseudo exercises of the blacksmith shop may also be open to question, for several of the exercises were first worked in lead before work in the harder metals requiring heat was attempted. [337 : 61] In many cases, exercises were first worked to exact dimensions in lead and then later wrought in iron or steel. In some cases, all three metals were used in the development of an exercise, thus requiring its performance three times. [36 : 88] Woodward did not consider these tasks too long or unnecessarily repeated. [339 : 10] Present practice would not justify such repetition.

The practices of the blacksmith shop were typical of the others with the exception that more of the blacksmith exercises resulted in finished products than was true in other departments. Of the thirty-eight exercises, fourteen (possibly seventeen) might be considered construction of articles of utility. [36 : 88] The pupil had only to follow instructions, for the drawings were furnished; he was told the tools he was to use and the order in which the various steps should be taken in the solution of the exercises after the various steps had been demonstrated by the instructor. There was little demand for creativeness or resourcefulness on the part of the pupil until at the very end of the course when one or two new exercises were presented by the teacher. In these exercises, after receiving the drawings from the teacher, the pupils were supposed to "be required to think out and put down in writing and illustrate by drawings: (1) the order of the steps, (2) the tools to be used,

(3) the methods of work." [36 : 104] This device bears a similarity to the "job plan sheet" advocated by Newkirk and Stoddard. [21 : 54–55] It allows a very limited initiative on the part of the pupil.

Although Woodward claimed the object of the shop and tool instruction to be chiefly mental discipline, it is quite evident from his writings that he placed great stress upon the development of manipulative skills. Obviously, to him, the intelligent use of tools and the selection of correct methods of working were a means to the end he had in mind. It is apparent that he had regard for the concrete product only in so far as it could be used to show pupil progress. [36 : 30]

Related Materials

With so much emphasis being placed upon the acquirement of tool skills, the announcement stating, "A knowledge of materials and processes is as important as an acquaintance with tools" [336 : 49] seems somewhat out of place. Upon examination the statement is found to be alluding to the sequence of materials and processes as they are taken up in the various shops. It was considered as essential that the shopwork—carpentry, woodturning, pattern-making, and the other activities offered—be taken in a specified order as it was that the student do each exercise in graded sequence. [36 : 257] Thus it would seem that shopwork had reached a stage in the Manual Training School where it had become as formal as the academic training of the period which the managers of the institution had been so ready to criticize a few years before. A further examination of the literature of the institution does show that some emphasis was put upon related information dealing with tools and tool processes. [340 : 13–16]

Grading

It is recalled that Runkle put great stress upon a system for grading pupils' work. Woodward advocated a plan for grading quite like the plan devised by Runkle. Each exercise was broken up into elements and each element assigned a certain weight or value. The student was to be advised of the system of marking,

that he might better guard against his "weaknesses." As a move toward self-evaluation of their work, the students were to mark themselves by comparing their work with that completed by the teacher. [36 : 52–53]

Graduation Thesis

On the whole, all work of a practical nature was reserved until the senior year, when the pupil was expected to complete a satisfactory project as a graduating thesis. [339 : 14] The entire project, from the making of the drawings and the patterns through the requisite operations of machining, forging, fitting, and assembling of the parts to the completed job, was to be the work of the pupil. In the execution of the project, the members of the class, either jointly or separately, were expected to construct some machine. Such objects as jack screws, speed lathes, electrical apparatus, and a small engine were suggested as being within the range of ability of the pupil and the limitations of the shop. [36 : 148] Recitals by music majors carry this practice down to the present time. The idea is still new to many, who speak of the fine idea of requiring students to demonstrate their artistry in a finished work of high order as a condition of graduation.

Attitude toward Work of a Practical Nature

Although the greater interest of pupils in working upon articles of "immediate utility" or "intrinsic value" was first admitted as a possibility [336 : 56] and later recognized [337 : 60], nothing seems to have been done to substitute such articles for the abstract exercises as a teaching vehicle during the regular shop periods, except that a few finished articles designed for the use of the laboratories and shops were made by the pupils after they had completed their exercises and were considered competent to do practical work. [336 : 55] However, the catalogue of 1881–1882 makes reference to private work. Any student who desired to construct an article of private nature was permitted to work upon his problem outside of regular class hours, provided he could obtain the instructor's approval. [337 : 70] Sometime later, Woodward makes the suggestion that it might be a good plan at times to let the boy make

what he wanted to take away with him. In all cases the boy was to submit a working drawing and furnish his own material. [36 : 49] Whether or not this project could be made during the regular class hours is not stated. This may be another practice which existed only on paper, for, as Coates points out, as late as 1903 and 1904, Woodward was opposed to classifying under the category of manual training any articles that appeared to be useful models. [199 : 67, 70] In an article published about this same period, Woodward again suggests "synthetic exercises" to follow the "elements" at intervals for the purpose of stimulating pupil interest and "relating" the work of manual training. [214 : 1024] He implies this practice to be more necessary for the younger pupils than for the older, and tends to question the educational value of the "finer constructions." An article by Vickory in 1904 indicates that the exercise had remained the dominant force in the shopwork up until that time. [341 : 19]

Recognition of Individual Differences

Although Woodward had been interested in using the class method of instruction from the standpoint of economic efficiency, it is evident, at that early date, that the matter of individual differences was a problem in the school. There was a recognition of the fact that certain pupils required more help than others [337 : 60–61]; and that there were distinct differences in pupil ability. A few years later Woodward writes in a similar vein and says, "One of the first difficulties the teacher of woodwork will encounter is that of unequal capacity in the execution of work. Aside from differences of effort, attention, and application, there will be a marked difference in ability." [36 : 50]

He makes the somewhat questionable statement that these differences will be greater at the start than as the work progresses. His explanation was that the "natural aptitude of the pupils does not vary as widely as their antecedent opportunities for tool work have varied." [36 : 50] Since the class was to be kept together and all advance at the same rate, the solution of this problem was to give the brighter and more rapid worker supplementary problems involving processes already practiced. [337 : 61; 36 : 51] Further-

more, it was not expected that all the work assigned would be finished by each pupil. The pupil was supposed to apply himself so as to complete at least sixty per cent of the exercise. [36 : 51] "The essential thing is that it should be well begun and carried on with reasonable speed and accuracy." [337 : 60]

Class Size

Woodward evidently made application of the information he had gathered from the Rhode Island report [199 : 55] and organized his shopwork instruction upon a class basis. [339 : 15–16; 336 : 56] The tendency appears to have been to standardize the size of the class at twenty pupils [339 : 15; 340 : 18], although the equipment listed in the prospectus of 1879 for the pattern, blacksmith, and machine shops does not seem sufficient to carry out the same practice of class teaching that was characteristic of the carpentry shop. [339 : 16] No doubt equipment was added in the meantime to care for the additional number of pupils, for in his book Woodward suggests class sizes of twenty-four, twenty-two, and twenty for the first three years in order. [36 : 16, 74, 126] This receding size of classes in the second and third years shows an elimination of pupils because of poor work or other sufficient cause.

Influence of the School

The Manual Training School had been in existence only a short time before it attracted attention throughout the United States and Europe, and received visits from many persons interested in the methods and organization of the school. [199 : 78] Many requests came to Woodward asking for a list of the exercises used in teaching the shop courses. All of these requests were refused on the grounds that no one set of exercises was better than another, and in all cases the teacher should have a flexible enough course so that he could vary the exercises from year to year. [337 : 27]

Woodward must have wished to withhold his material for his own publication, for in 1887 he published his book, *The Manual Training School*. It would be difficult to estimate the influence this book may have had on the spread of manual training. It placed in the hands of the teacher complete sets of exercises with directions for their

use and execution. The book organized manual training as a teaching subject. For his illustrations, Woodward referred freely to the Manual Training School of Washington University, and, because of this fact, the book has value to the student of industrial arts who is interested in the early practices of that school. Every shop subject taught in the school was treated so as to convey a conception of the methods and practices which had been adopted. [36 : 16–149]

CHICAGO MANUAL TRAINING SCHOOL

A few years intervened after the opening of the Manual Training School of Washington University before the Chicago Manual Training School began to function on February 4, 1884, with a class of seventy-two pupils under the direction of Henry H. Belafield. [11 : 340] To this institution belongs the distinction of being the first manual training high school to be established without some connection with a college or university. [11 : 339] Like the Boston Whittling School and its immediate successor, the school was promoted by a group of laymen [11 : 339], the most active of whom were Augustus Jacobson and Charles H. Ham. [215 : 889] Both of these men had visited the Manual Training School of Washington University [36 : 172; 11 : iv] and had apparently been greatly influenced by their visits. Ham, shortly after his return, started writing in one of the Chicago newspapers a series of articles in which he advocated a manual training school in the city of Chicago. These articles, combined with a series of editorials in the same paper, were contributing factors in the founding of a school that was more or less the outgrowth of a protest against the educational policies of the city prevailing at that time. [11 : 340]

Influence of the Manual Training School of Washington University

The object of the school, as quoted by Ham from the articles of incorporation, is practically identical with the statement of the object of the Manual Training School of Washington University. [11 : 341] According to the account of Ham, the influence of this St. Louis school was not confined to the statement of the object of the school but permeated the practices of the school as well. Such

a condition might well be expected from the address of E. W. Blatchford, president of the board of trustees of the Chicago Manual Training School at the laying of the corner-stone for the building, when he said:

> Our indebtedness should be acknowledged for practical suggestions and valuable ideas to the St. Louis Manual Training School and its able director, C. M. Woodward. Opportunity was afforded for personal observation of this school by a visit of our club to the St. Louis Commercial Club in October of last year. Our own course will closely follow the curriculum prescribed by the St. Louis School. [199 : 78]

Method

The sequence of graded exercises of the Russian system of shopwork characterized the work of the institution. [11 : 18–94]. Like the archetype, the shopwork in this school soon reached a state where it became almost as formal as the academic studies which had been so severely criticized by the founders. Ham writes of the class period starting with a ten or fifteen minute lecture by the instructor on such subjects as the history of the activity, certain related information, or tools and processes. Following this lecture came the demonstration of the new tool or process to be taken up that day, after which the pupils went to their benches and proceeded to work out the problem. Near the end of the period, the class was called together for the testing of the exercise and a discussion of the problems that had arisen. At times questioning by the instructor took the place of the lecture. At the close of the lecture or during the demonstration, opportunity was offered the pupils to ask questions in order to clear up any point they did not understand.

The pupils worked either from drawings or from models assigned by the instructor. In only a few cases were the pupils permitted to select their own problems. When drawings were used, the teacher often placed the drawing on the blackboard with explicit step-by-step directions for completing the task. The directions and drawing were copied by the pupil in his notebook for reference. A similar procedure was used whenever models were supplied by the teacher. [11 : 18–94; 216 : 43–44]

No doubt, many other schools might well have been included in this account because of their contributions to manual education during this pioneer stage, but the writer has confined his report to the few schools described because they appear to have set the pattern for most of the manual training schools which followed until the introduction of the Swedish sloyd system.

SUMMARY

As has been pointed out, the original aim of the shop activity work in the Boston Whittling School was to give wholesome and enjoyable work of a type in which the pupils would normally engage. The value of the work was considered to rest in the activity rather than in the tool process. Primary consideration was given to satisfying the creative and constructive impulse of the pupil.

Following the exhibit of the shopwork of the Russian Imperial School at the Centennial Exhibition at Philadelphia and the adoption of the Russian system of tool work at the School of Mechanic Arts in the Massachusetts Institute of Technology, a change of emphasis in the shop activity is noted. Although the educational leaders of the movement advocated the work for general educational purposes, there were many who looked upon the activity as a means of having the school contribute more directly to the training of the young for some form of manual industry, with the result that there was much confusion of objectives. The latter group looked upon the school as a preparation for life, a philosophy which continued to dominate until the acceptance of the Dewey philosophy in the early part of the twentieth century.

The proponents of manual training had not hesitated to criticize the formalism which they claimed permeated academic teaching, but with the adoption of the "Russian system" shopwork became as formalized as that type of education which it was supposed to correct. Since the class method of teaching was dominant in this system, little consideration was given to individual differences and each child was regimented through a sequence of exercises with little if any opportunity for self-expression. The philosophy of teaching shopwork during this period appears to converge in the one word "dictation." Teaching and telling were synonymous. Individual

creativeness never had a chance; the teacher selected the exercise, made a drawing or a model of it for use in presentation to the class, and then told how to make it. Apparently, the superior pupil was the one who could best follow directions; initiative and judgment were not essential.

Variety in teaching devices seems to have been limited. The exercise and the demonstration were accorded precedence over all others to the extent that a person casually perusing the literature would hardly be aware that other devices were being used. Lectures were mentioned, but the writer is led to believe that they took on more of the nature of a shop talk in connection with the demonstration. Illustrations and lesson sheets appeared early in the history of the work, both as a means of teaching and as an aid in refreshing the mind of the pupil. Whether illustrations were more than blackboard sketches or other forms of sketches is a question. It is interesting to learn that some of the leaders early felt the need of a textbook and made an effort to prepare one which would be more or less self-instructive. Another device utilized was a system of grading which was stressed both in the School of Mechanic Arts and in the Manual Training School of Washington University. Other devices mentioned were notetaking, questioning, written and oral examinations, and excursions.

CHAPTER V

PUBLIC MANUAL TRAINING SCHOOLS PIONEER PERIOD, 1874–1884

PATRONAGE BY PRIVATE INTERESTS

INTEREST in manual training by private individuals and organizations went beyond expression in private schools and associations and extended into the public school systems. Many of the early experiments with manual training in connection with the public schools were promoted, either wholly or in part, by private individuals or organizations. Six of the ten cities establishing manual training departments during the period from 1874 to 1884 were operating their departments with the aid of support other than public school funds. Montclair, New Jersey; New Haven, Connecticut; Baltimore, Maryland; and Eau Claire, Wisconsin, were the four cities to establish manual training courses in public schools during this period with funds raised by taxation. One of the four, New Haven, was later to have manual training work stimulated by a trust fund.

It is interesting to note that two out of the six manual training departments starting with private funds were initiated by superintendents of schools. The other four were started by philanthropic organizations or individuals interested in providing the benefits of manual training for as many as possible.

Jamestown, New York

Jamestown appears to be the first public school system in the United States to be successful in the attempt to introduce manual training into the schools in an effort to meet the demands of the public for a more practical education. [17 : 21] The beginning was made in the fall of 1874 when a printing press, type, and fixtures were purchased with part of a fund received from annual

school exhibits. [17 : 22] The school system provided the teacher and the room, but all other expenses were largely cared for by this fund. This practice evidently continued for some time, for in the report of 1889–1890 the statement is made that "the state has assumed partial responsibility for carrying on work formerly supported by funds obtained by exhibitions put on by teachers and pupils." [276 : 8]

Gloucester, Massachusetts

The early experiments with manual training in Gloucester were made under the patronage of Miss Marian Hovey, one of the trustees of the estate of George O. Hovey. In September 1878, Miss Hovey placed a sum of money at the disposal of the school committee "to be expended for the industrial education of boys." [218 : 179] Miss Hovey supported the experiment for a period of over two years. At the end of that time the work was dropped, since the city did not feel that it was financially able "to undertake such an experiment on a large scale in the public schools." [275 : 58]

Boston, Massachusetts

The first experiment in manual training to be made in the Boston School system was promoted and financed by the Industrial School Association. This association, after several years of success in a private venture, offered the School Board the use of their equipment and agreed to pay all tuition costs if the Board would permit the masters of the Dwight and Sherwin Schools to have manual training taught to such pupils as they felt might be benefited. [249 : 26–27] The offer of the Association was accepted by the Board and although the original plan called for an experiment in each of the two schools, the project was confined to the Dwight School because of the difficulty in locating a suitable room. [252 : 4] The experiment must have proved satisfactory to the community for in 1883 the City Council made a special appropriation of $2,500, at the request of the Board, to be used in defraying the expense for one year of initiating manual training into one of the public schools of the city. [250 : 39]

Peru, Illinois

The first attempt to include shopwork in the public school program of Peru was in January 1884 when "Mr. Joseph Carter, then Superintendent of Schools, upon his own responsibility, and with his own money, purchased twenty sets of carpentry tools and ten work-benches, and fitted up the basement of one of the school buildings as a work-shop." [198 : 192]

Cambridge, Massachusetts

The early manual training work in Cambridge, Massachusetts, was due to the activity of the Cambridge Industrial School Association. This organization was formed in the autumn of 1879 under the influence of the Reverend G. L. Chaney, who had played an active part in the Industrial School Association of Boston. [258 : 54–55] In February 1884, the Association "made a generous proposal to the School Board to furnish a competent teacher, and the necessary tools and equipment, to instruct a class of twelve boys as many afternoons each week as desired." [258 : 18] The proposal was accepted and arrangements were made whereby five classes selected from all of the grammar schools were to receive instruction for one afternoon each week. [258 : 18] The same offer was repeated and accepted during the three years following. Private support of the manual training work in Cambridge was to continue until 1899 when the Rindge Manual Training High School was formally turned over to the city. [259 : 58]

Toledo, Ohio

Bequests of Jessup W. Scott and his heirs and of William Raymond were largely responsible for establishing the Toledo Manual Training School. [198 : 405–406] The original purpose of the fund was to found and perpetuate the Toledo University of Arts and Trades. The trustees attempted for several seasons to realize the purposes of the donors but were unable to do so with the resources at hand and on January 18, 1884, made a tender of the University property to the city of Toledo, on condition that the city would assume the trust. [198 : 406] The property was accepted by the Common Council on February 7, 1884 [198 : 406], and on

March 18, the Council approved an ordinance establishing Toledo University. Section 683 of the Revised Ordinances of the city reads:

> The first department of such University to be opened shall be designed and known as the Manual Training School, and shall be devoted to instruction in the practical arts and trades. [198 : 407]

New Haven, Connecticut

Although the manual training work in New Haven, Connecticut, was introduced at public expense during the school year of 1883–1884, the experiment was further encouraged and stimulated by the establishment of a trust fund of $10,000. The donor stipulated that the income from this fund was to be applied toward the support of instruction in the industrial arts. [290 : 35] Mrs. Boardman, donor of the fund, also donated five hundred dollars to the treasury of the Board to be used for instruction in industrial arts during the school year of 1885–1886. [290 : 6] Several years later, the munificence of Mrs. Boardman did much to hasten a manual training high school in Cambridge.

BALTIMORE MANUAL TRAINING SCHOOL

To the manual training school established at Baltimore, Maryland, in March 1884, belongs the distinction of being the first school of the type to be founded and supported by public funds. [243 : xxvi] The School of Mechanic Arts, the St. Louis Manual Training School, and the Chicago Manual Training School were already in operation, but each of the first two schools named was affiliated with an institution of higher learning and all three were supported with private funds aided by tuition fees. The establishment of the Baltimore Manual Training School marked a new era, for it was the first institution of this type to become an integral part of a city public school system, tax supported and free to the residents of the city.

Two factors appear to have stimulated the beginning of the institution. The first was an attempt to meet the criticism, often made, that the instruction given in the public schools was exclusively mental. The other was a desire to experiment with a new system of parallel instruction. [243 : xxiii–xxiv]

GRADE LEVELS WHERE SHOPWORK WAS FIRST INTRODUCED

Of the ten cities mentioned as having some form of manual training work in connection with the public school system, five of them, Gloucester [274 : 42], Boston [252 : 4], Montclair [228 : 53], New Haven [289 : 62], and Cambridge [254 : 18], started the work in the higher grammar grades. Three cities, Jamestown [17 : 22], Peru [202 : 76], and Eau Claire [240 : 38], offered manual training activities in both the grammar grades and the high school. The remaining two cities, Baltimore [243 : xxviii] and Toledo [318 : 63], offered manual training courses only in the high school.

TYPES OF WORK OFFERED

All of the ten cities offered some form of woodworking: carpentry is listed by five cities; joinery, by four; and woodworking by one. An examination of the type of work offered shows the courses listed under carpentry to consist largely of tool processes and joinery, so that at least nine cities were offering courses in their schools which might well be classified under the heading of joinery.

Although the Baltimore Manual Training High School aimed to offer instruction in such shop subjects as freehand and mechanical drawing, carpentry, forging, pattern-making, molding, woodcarving, woodturning, vise-work, machine-shop practice, and certain sheet metal processes [243 : xxvi], only such shopwork as carpentry and joinery, vise-work, forging, woodturning, and soldering were taught during the year 1884. [244 : 107] The Toledo Manual Training School had enlarged its program by 1886 so that it was teaching practically the same shop subjects as the Baltimore Manual Training School, together with the additional subject of clay modeling. [198 : 416] In 1884, its program had been limited to carpentry or light woodwork, and freehand and mechanical drawing. [318 : 63] Only two of the other eight schools offered any shop activity other than carpentry or joinery. Jamestown, New York, offered printing [17 : 22, 26–27] and Montclair, New Jersey, offered woodcarving. [228 : 53]

PURPOSE

Teaching pupils the correct use of tools appears to have been the chief object of the shop courses during this period. This object is stated in the New Haven report for 1885 [290 : 41], and an examination of the reports of other schools would indicate the same object was common to those places.

COURSES OF STUDY

Some of the earlier public school shop courses apparently were not greatly influenced by the development of the "Russian system" in such private schools as the School of Mechanic Arts and the Manual Training School of Washington University. Although Love was carrying on his experiment at Jamestown during the expansion of the Russian system in this country, he makes no mention of the system in his writings. He apparently was engaged in working out a philosophy largely his own, and, while the course of study required a number of exercises in tool processes when the boy first started shopwork, the course was so planned that he would eventually be making useful objects for the home or laboratory which would require applications of the principles learned about these tools and processes. The earlier exercises were dictated but some opportunity was allowed the pupil to design the later objects to be made. [17 : 186–190] New Haven, Connecticut, and Peru, Illinois, followed the practice of having boys gain information in tool processes by the application of principles in the making of objects of utility. An examination of the printed list of fifteen lessons taught in the Boston Latin School, under the direction of George Smith, also shows few exercises other than those incorporated in the making of some useful object. [247 : 90–92] This fact appears rather striking inasmuch as Smith had served as an instructor in the School of Mechanic Arts, an institution where abstract exercises had been the rule.

The remainder of the schools offering manual training work based their courses largely on a series of abstract exercises in tool processes and joinery, which bore a strong resemblance to the exhibition of the Russian Imperial School at the Philadelphia Centen-

nial of 1876. Greatest emphasis was put first upon a knowledge of tool processes to be learned through a series of abstract exercises involving the particular tool to be stressed. Once a knowledge of the use of these tools had been acquired, the next step was to apply this knowledge in the construction of a sequence of joints. If practical application of the tool processes and joints were made, it was provided by letting the pupil make some form of box or frame.

TEACHING METHODS AND DEVICES

From the information gleaned from the reports of the schools offering manual training courses during the first decade, teaching methods and devices were extremely limited. Class instruction through teacher demonstration and practical application on the part of the pupil appears to be the most common practice. One report mentions the use of both class and individual instruction. [244 : 109] Baltimore made use of excursions as a teaching device, for Grady reported sixteen trips to commercial plants representing a variety of activities. [244 : 114] Illustrations in the form of blackboard drawings were used in Montclair as a means of teaching layout work. [236 : 198] Toledo also made use of the illustration as a teaching device in the manual training school. [198 : 412] According to the last report of the Cambridge Industrial School Association, as copied by E. S. Dixwell and printed in the annual report of the Cambridge School Commissioners, demonstration and illustration were practiced in their manual training school. [258 : 60]

The requirement that a drawing be made before construction could be started in the shop had not reached the status in this period that it was to attain in the following period. Only four cities report this procedure as being required.

THE USEFUL ARTICLE AS A SCHOOL SHOP PRODUCT

New Haven offered far greater freedom in the selection of problems than did any of the other cities. The report for 1885 lists a number of articles of utility that had been made or were in process. [290 : 36] Farther along in the report is a statement by French, who says, "The purpose has been to produce useful articles. . . ."

[290 : 37] This motive might be explained by the fact that the sale of finished articles to parents and others was depended upon as one means of paying for the cost of materials, so as not to exceed the appropriation. Peru and Boston also made extensive use of articles of utilitarian value as a teaching vehicle in their school shops during the scheduled class period. Eau Claire offered some opportunity for making useful articles to those boys who desired to do extra work on Saturdays or holidays.

Love, in his book, *Industrial Education,* suggests some useful problems for the pupils to solve after they had acquired a knowledge of the processes of shopwork. [17 : 280–285] There is a question whether or not he was following this practice previous to 1884. Ten of the suggested models might well have been used in connection with the science department, so that Love may have been thinking of the possibilities of correlation of manual training with other subjects even at that early date.

PRODUCTION WORK

Although most of the work was of an individual craftsman type, unit production work early found a way into the shop. Love speaks of production work in connection with his classes in printing. According to his statement, he had the classes do a large share of the printing of the Board of Education so as to avoid such criticisms from the community as "useless," "unnecessary expense," and "not educational." [17 : 22–23] The reports of Montclair mention certain equipment for other departments as having been made by manual training classes. [228 : 54] Baltimore also reports the work done by pupils in preparing the various shops and shop equipment for use. [245 : 115]

CLASS SIZE

Class sizes during this period show a range from two in a class to twenty-five. Love reports two boys working at the one bench in the basement of the school in one-half hour shifts for a period of one hour. [17 : 26] In 1882, four benches were placed in the new building as part of the equipment. [17 : 26] If the assumption is correct that these benches were of the double type common to the

period, then Jamestown was prepared to accommodate a class size of eight in bench woodworking. Grady reports class sizes of twenty-five each in the woodworking and metalworking departments of the Baltimore Manual Training School. [244 : 109] Toledo [318 : 63] and Peru [198 : 192] considered twenty pupils the maximum class size. The number enrolled in woodworking in Montclair ranged from eighteen to twenty. [228 : 53] Boston used a class size of eighteen in the Dwight School experiment. [252 : 4] Gloucester [222 : 179], New Haven [289 : 62], Cambridge [254 : 18], and Eau Claire [198 : 204] report class sizes of twelve. Assuming the class size of Jamestown to have been eight, the median class size of the ten schools would be thirteen. If only the eight cities without manual training high schools are considered, the median class size will be found to be twelve pupils, or a difference of one less pupil than when all schools are considered.

TIME ALLOTMENT

A study of the time allotment for manual training in the ten schools shows a range from 90 minutes per week to 450 minutes per week. The median of the ten schools was 194.5 minutes per week. The median time allotment for pupils taking manual training in grammar schools was 132 minutes per week; for high school pupils, it was 250.5 minutes per week. This difference in time allotment is due largely to the increased number of times the high school manual training classes met. Although the grammar school offered a period mean of 76.8 minutes, which was greater than the high school mean of 66 minutes, the high school classes met for a mean of 3.8 periods per week compared with the grammar class mean number of 2 periods per week.

MANUAL TRAINING LARGELY AN ELECTIVE SUBJECT

Manual training was considered an extra subject during this first decade in the public schools and was largely an optional subject not required of all pupils. Seven schools report the work as being elective. If pupils in Baltimore or Toledo elected to attend the manual training high school, the shopwork was automatically compulsory. Jamestown appears to have required pupils to take manual train-

ing. Montclair applied this requirement to grammar school pupils. New Haven reports that classes were made up of pupils selected on the basis of scholarship, although the reports do not indicate whether the pupils had a choice in joining the class.

INFLUENCE OF INDUSTRIAL SCHOOL ASSOCIATION MANUAL

The manual published by the Boston Industrial School Association may have had an influence in determining the course of study in the Cambridge school although it may not have been used as a text. The report of E. S. Dixwell, in referring to the sixteen lessons taught during the year, says, "These lessons follow to a great extent the manual entitled 'Wood Working Tools,' published by the Industrial school in Boston." [258 : 56–57] The manual may also have influenced the character of the work at Gloucester, Massachusetts. William R. Ware, in his capacity as chairman of the committee preparing the manual, states that lessons arranged by the committee "were placed in the hands of Mr. C. H. Dow, who taught a school of this kind in Gloucester, Mass., in 1878–1879, from whom valuable suggestions were afterwards received." [34 : vi] Woodward mentions the influence of this manual upon early manual training schools and gives 1881 as the first publication date. [210 : 882] The manual must have had rather a wide circulation, for Clarke gives 1882 as the publication date of one edition [198 : 17], and the writer has seen other copies published in 1884, 1887, and 1896.

TEACHER QUALIFICATIONS

The qualifications of manual training teachers appear to have been dependent largely upon skill in the use of tools. Three cities, Gloucester [222 : 179], Boston [252 : 4], and Cambridge [258 : 55], report carpenters being employed as teachers. Two cities, Jamestown [17 : 26–27] and New Haven [289 : 62], report the use of janitors as teachers of manual training. Superintendent Love apparently was of the opinion that anyone was qualified to teach shopwork for he makes the statement that,

> A good janitor who is a mechanic can be employed to instruct the boys in the shop, or if he cannot do it an older and more mature pupil can be put in charge of the shop, and by employing two or more of these, the shop

can be kept open for work all day. And a young man of quick intelligence, and active body and mind, can in a short time learn to take charge of the printing office. [17 : 18]

On completion of the separate shop building in 1882, Love put his theories into practice and placed two young men, who the writer is led to believe were upper-classmen, in charge of the shop under the general direction of the janitor. [17 : 16–17, 27]

R. L. Barton, Superintendent of the Peru, Illinois, schools held a somewhat opposed view. In his opinion, the employment of a person familiar with the principles of teaching was to be preferred to placing the manual training class in charge of a carpenter. He says, "A fair knowledge of tools and how to use them, plus a knowledge of how to teach, make the best combination for a Manual Training Instructor." [198 : 192] Barton does not state the source from which the manual training instructor was drawn for the year and a half period before he became superintendent, but the implication would lead the writer to believe that the first instructor was a carpenter. Woodward presented a similar point of view at a meeting of the National Education Association in 1884, when he said, "Your shop teacher should be well educated and a natural teacher. Don't relegate manual training to the janitor." [209 : xcvi] Professor Ordway, speaking before the Department of Superintendence in 1884, also raised the point of the need for trained teachers of shopwork. He said:

> The agitation respecting industrial education has already gone so far in this country that not a few are ready to start in the matter, if they only knew how. The first step should be in the direction of having a properly trained body of teachers. [201 : 125]

INFLUENCE OF MANUAL TRAINING SCHOOL OF WASHINGTON UNIVERSITY

The St. Louis Manual Training School served as the model in the organization of both the Baltimore [243 : xxv] and the Toledo Manual Training Schools. [198 : 407] The Baltimore Board of Commissioners looked upon the results of the work of the St. Louis Manual Training School as most satisfactory. In fact, the President of the Board thought so well of the school that he sent

Grady to St. Louis and Chicago to inspect the manual training schools of those cities that he might better understand the organization and plan of these institutions. [243 : 106–107] Since the Chicago Manual Training School was patterned from the St. Louis Manual Training School, similar plans were found in each city.

The influence of the St. Louis school upon the Baltimore school may be noted in several ways. An examination of the stated objects of the two schools will disclose that, with the exception of a minor variation in the first sentence, the two statements are the same. [243 : xxvi; 339 : 5] A like similarity is to be noted in the courses for they were of the same length, included practically the same academic and shop subjects, and devoted the same amount of time to shopwork and drawing. [339 : 14–15] Like the St. Louis school, the Baltimore school [243 : xxvii–xxviii] required a satisfactory project for a thesis to be carried through to completion in the senior year. [243 : xxviii] Candidates for admission were also required to be at least fourteen years of age.

The St. Louis Manual Training School also served as the model in the organization of the Toledo Manual Training School. [198 : 408] The statement of the object of the Toledo school, in this case also, follows very closely the phraseology to be found in the prospectus of the St. Louis school. [198 : 421] Many other statements appear to have been lifted bodily from the prospectus or later catalogues of the St. Louis school. Some slight change is to be noted in two instances: the age for entrance was reduced to thirteen years [198 : 421], and the course was lengthened to four years so as to permit boys and girls of the senior grammar grades to take shopwork. [198 : 417] The details of instruction are the same as those to be found in the catalogue of the St. Louis school for 1881–1882. [198 : 417; 337 : 60–61] It is interesting to note that the same statement appeared in the Toledo report for 1891 [318 : 80], a decade after it had appeared in the catalogues of the St. Louis school in 1881–1882. Pseudo-work in lead continued to be looked upon as a necessary device for teaching forge work. [198 : 422] An examination of the statements in the Toledo catalogue in regard to the courses in carpentry, woodturning, and forging will show they are almost identical with statements to be

found in the prospectus of the St. Louis School. [198 : 421–422; 340 : 13–15] A part of this influence may be attributed to the fact that Ralph H. Miller, Director of the Toledo Manual Training School, was a graduate of the St. Louis Manual Training School. [198 : 408]

INFLUENCE OF THE SCHOOL OF MECHANIC ARTS

The St. Louis Manual Training School was not the only institution of the type to influence the practices of the Baltimore Manual Training School; the School of Mechanic Arts of the Massachusetts Institute of Technology also made a contribution. On September 1, 1884, the courses in carpentry and joinery, and vise-work of the School of Mechanic Arts were adopted in the Baltimore Manual Training School. [244 : 109] These courses, as listed by Grady, consisted of a graded series of exercises [244 : 109–110] and were quite typical of practice in the School of Mechanic Arts.

These two original manual training high schools, the Manual Training School of Washington University and the School of Mechanic Arts, were to exert a strong influence not only in the schools mentioned here but in those to develop in the next decade and even later.

SUMMARY

Interest in manual training by private individuals and organizations extended into the public school systems. Six of the ten cities establishing manual training departments during the period from 1874 to 1884 were operating these departments with the aid of support other than public school funds. Five of these cities started the work in the upper grammar grades. Three of them offered manual activities in the grammar grades and the high school, while two cities offered manual training courses only in the high school.

All of the schools offered some form of woodworking courses that consisted largely of tool processes and exercises in joinery. Only two schools offered any shop activity other than carpentry and joinery. Nearly all the courses were based on abstract exercises, although the schools in two cities attempted to give a knowledge of tools and processes through the medium of useful articles. A few

of the other schools permitted the pupil to work on useful articles after he had completed the required course of exercises, or at such times as he desired to work in the shop outside of regular class hours.

Manual training was for the most part an elective subject. Class sizes show a wide range. The median-sized class consisted of thirteen pupils. The median time allotment for the grammar schools was 132 minutes per week and for the high school, 250 minutes per week.

Teaching methods and devices appear to have been extremely limited. Class instruction through demonstration by the teacher and practical application on the part of the pupil seems to have been the most common practice. One school reports using individual instruction to supplement the class instruction. Three schools make reference to illustrations. Another mentions the excursions taken by the pupils to industrial plants. Production methods were used to some extent in three of the schools. The models listed in the course of one school indicate that some attempt was being made to correlate the work of the science and manual training departments. It is not known conclusively, but the writer believes the manual prepared by the Boston Industrial School Association influenced the practice in two of these cities.

The qualification for teaching school shopwork during this early period appears to have been dependent largely upon skill in the use of tools. Three cities report carpenters and two cities report janitors teaching the shopwork. Even at this early date there was agitation for well trained teachers in shopwork.

The Manual Training School of Washington University was the model from which the Baltimore Manual Training School and the Toledo Manual Training School were patterned. The Mechanic Arts School also exerted some influence on the Baltimore school.

CHAPTER VI

PUBLIC MANUAL TRAINING SCHOOLS, 1884–1894

PATRONAGE BY PRIVATE INTERESTS

THE stimulation of interest in the manual education theory by lay individuals did not end with the establishment of the Toledo Manual Training School but continued into the nineties. These promotional activities took many forms: some started as private schools, later to be absorbed into the public school system; some found expression in building and equipping manual training schools; and still others furnished equipment and instruction. Nine of the seventy-two cities listed in the *Report of the Commissioner of Education for 1893–94* offering manual training courses in the field of secondary education [215 : 2097–2113] received aid in one form or another from laymen interested in manual education for public schools.

Cleveland, Ohio

Manual training in Cleveland, Ohio, first began as a private venture when Newton M. Anderson, who was at that time an instructor in physics at the Cleveland Central High School, organized and conducted a small class in carpentry for the benefit of some high school pupils. [267 : 54–55] This experiment, starting in February 1885 in a small carpentry shop located in a barn, was largely responsible for the early adoption of manual training in the Cleveland public school system. Through the activity and enthusiasm of the boys enrolled in this class, a number of business men became aware of the potential value of manual training and several meetings were held to discuss the question of establishing a manual training school in Cleveland. [267 : 54] The outcome of these meetings was the formation of a stock company with a capital of $25,000. This sum was to be used in erecting and equipping a building wherein shop

and related classes could be taught. [267 : 54] The money necessary to cover running expenses was to be raised by charging a tuition fee.

On June 2, 1885, the Cleveland Manual Training School Company was incorporated "for the purpose of the promotion of education, and especially the establishment and maintenance of a school of manual training, where pupils shall be taught the use of tools and materials, and instruction shall be given in mechanics, physics, chemistry, and mechanical drawing." [267 : 54–55] The school was opened to pupils early in February 1886 [267 : 55] and was so successful during the two years following that a movement was started to place the enterprise in the hands of the public school authorities, so as to offer an opportunity for worthy young men, who could not pay the tuition charge of forty dollars a year, to receive shop training.

This movement was warmly encouraged by the Manual Training School authorities, and they proposed to turn over the free use of their building and equipment to the Board of Education, who were "to pay the bills necessarily incurred in the regular running of the school, on condition of free tuition to Public School pupils." [198 : 438] As a means of defraying these expenses, the Board of Education petitioned the State Legislature for authority to levy a two-fifths mill tax, which was granted. [198 : 438] The direction of the school was placed under a form of dual board, eight of the directors being chosen by the incorporated company and seven by the Board of Education. [198 : 438] This relationship continued until 1892 when the working agreement with the Cleveland Manual Training Company was concluded and the Board purchased a site near the Central High School and commenced the erection of a building for manual training classes. [270 : 59]

Cambridge, Massachusetts

Reference has already been made to the experiment conducted by the Cambridge Industrial School Association in teaching manual training to pupils in the grammar schools of Cambridge, Massachusetts. This working arrangement between the public schools and the Association continued until 1888, when it was discontinued to

try out the enlarged program of Frederick R. Rindge. [256 : 27] In 1887, Rindge had made an "offer of an industrial school building ready for use, together with a site for the same." [255 : 26] Rindge had already made numerous gifts of other buildings to the city of Cambridge. In this particular case he appears to have been motivated with a desire to offer an educational system that would function in training the boy of "average talents" how to make a living and how to live. [255 : 26] The buildings and equipment are estimated as having cost close to $150,000, but the generosity and interest of Rindge did not end here; he continued to pay the annual expense of the school, amounting to about $25,000, until the school was formally turned over to the city on January 1, 1899. [259 : 54] This school offered a three-year course in shopwork and had a working relationship with the English High School; two hours were spent there in recitations and three hours were spent in shopwork at the Manual Training High School. [256 : 27]

New Haven, Connecticut

The manual training program of New Haven, Connecticut, was greatly aided through the generosity of Mrs. Lucy Boardman, who was intensely interested in the educational methods of manual training. Mrs. Boardman had established a trust fund of $10,000 in 1885, the income from which was to help defray the expense of instruction in manual training. Seven years later, because of her desire to provide a fitting memorial to her husband and to enlarge the manual program of the city, she offered the sum of $30,000 toward the erection of a manual training building on condition that the school district equip the building and supply the instruction. [292 : 7] The following year Mrs. Boardman increased this amount to $60,000 [293 : 7], and in 1894 further increased this amount to $70,000 to pay the total cost of the building. [294 : 6]

Louisville, Kentucky

An attempt was made to introduce manual training into the Male High School of Louisville, Kentucky, in 1880. [279 : 88] However, it was not until October 1890 that classes actually started. [279 : 92] Several members of the Board, private citizens, and

the Conversation Club had put forth efforts in the meantime to get the work started. [279 : 88–91] The movement seems to have had two very staunch friends in Andrew Cowan and A. V. du Pont. Both of these men were among the signers of a resolution requesting the School Board to establish a manual training high school as a distinct unit. Du Pont undertook to raise $35,000 by subscription for the purpose of erecting and equipping a building for manual training. He was able to raise only $22,000 and so abandoned the plan; but he never gave up the idea of a building, for on May 2, 1892, he laid the following proposition, over his signature, before the Board of Trustees of the Louisville Public Schools:

> Gentlemen—I propose to purchase a suitable lot, to erect thereon a building suitable and sufficient to accommodate three hundred pupils, to equip said building with furniture, tools and machinery suitable and necessary for a Manual Training High School of the first order, and convey said property when complete, to the Louisville School Board in trust and upon the following conditions: . . . [279 : 93–94]

Among the seven conditions enumerated were: that the property should be used only as a Manual Training High School; that it should be established and maintained as a part of the public school system; that no special trades be taught or any articles manufactured for sale; and, sensing the importance of well trained teachers, he further stipulated that "the teachers and professors in the manual training department shall in every case be graduates of some reputable Manual Training School." [279 : 94]

This proposition was accepted by the Board, and Du Pont proceeded with the execution of his proposal. The school was opened on October 3, 1892, and formally dedicated on May 1, 1893, at which time Du Pont "presented a deed for the entire property to the President of the School Board." [279 : 94–95]

Newport, Rhode Island

The manual training movement in Newport, Rhode Island, had an advocate in Miss Ellen Townsend. Miss Townsend's first attempts to interest the City Council in manual training began in 1870 and finally ended in 1873 without result because her plan required a legislative grant of authority which was refused.

[296 : 24–25] Miss Townsend died in 1886 and her will provided that the remainder of her estate, after other bequests had been cared for, be given "to the City of Newport to be securely invested and the income thereof to be paid over to the School Committee of the said City who are directed to apply said income as they may receive the same in aiding promising boys to learn useful mechanical trades." [296 : 27] This residue, approximately $18,000, was used later to aid in building the Townsend Manual Training School.

Menomonie, Wisconsin

Menomonie, Wisconsin, was another city to benefit by the patronage of a private citizen. The first step in that city toward manual training was taken in October 1890, when James H. Stout made the following proposition to the Board of Education:

> I will place upon the school grounds, in a place to be designated by the board of education, a building of the proper size and kind, furnished with all the equipments necessary for the instruction of classes of boys and girls in the subjects included in the first-year course in manual training. I will also pay the salaries of the necessary teachers, the cost of all necessary materials and supplies, and all the contingent expenses for three terms or for a time equivalent to three school terms, except such a part thereof as shall be paid by five hundred dollars which is to be provided by the board of education. [153 : 263]

The proposition was accepted and the building was ready for instruction in January of the following year. The experiment was so successful and popular that Stout "was encouraged to provide the school with a more ample and convenient building and a whole complement of furniture and equipment, which should enable the extension in due time of manual-training courses, for both boys and girls, over the entire lower grades and high school period." [153 : 264–265]

Four years later this second building and the central school building on the same property were destroyed by fire. Stout's philanthropic interest in educational effort again found expression, for not only did he rebuild and refurnish the manual training building at a cost of $100,000 but he aided in the construction of the central school building to the extent of an additional $25,000. [153 : 265]

Chicago, Illinois

The manual training movement in the grammar schools also had a portion of the patronage during this developmental period, just as it had enjoyed it during the pioneer period. Chicago, Illinois, had several patrons who appear to have worked independently of one another. A manual training high school had been opened there early in 1886 [260 : 83] as a supplementary school to the established high school. Pupils enrolled in the manual training courses attended classes in their academic studies in the "English" high schools during the morning session and spent two and a quarter hours in the afternoon at shopwork and drawing in the manual training school, but the work did not extend below the freshman class in high school.

During the year of 1891, Richard T. Crane offered to furnish the necessary tools, equipment, and materials and a teacher to give instruction in woodworking to as many boys of the seventh and eighth grades as could be accommodated. The Board accepted his offer and permitted him the use of the basement rooms in the Tilden School. Twenty-five benches and necessary woodworking equipment were ready when the school opened on January 1, 1892. [260 : 58–59] Three classes were selected from each of five grammar schools to take shopwork two hours a week. In regard to this experiment, Superintendent Lane made the statement: "The work in manual training, which was introduced into the Tilden School, . . . has been very satisfactory. It has been fully demonstrated that manual training is an important element in the general education of a child." [263 : 41]

The following year the Chicago *Evening Post* fitted up a shop in the Jones School with tools and benches. In this center, the city employed the teacher, although the organization was on the same general plan as that at the Tilden School. Pupils from five grammar schools were scheduled to use the shop in the Jones School two hours each week. [262 : 64] Three years later Superintendent Lane reports manual training equipment having been presented to the Hammond School through the generosity of Cyrus H. McCormick, "who has become greatly interested in the extension of this part of our educational work." [264 : 69]

St. Louis, Missouri

Manual training in the public schools of St. Louis, Missouri, was introduced into the L'Ouverture School, a school for colored children, during the year 1890–1891. Since no public funds were available when this experiment was initiated, it was financed by private subscription. [306 : 64] During the years of 1897 and 1898 the Board of Education considered the advisability of extending manual training to the other schools, and after some study and investigation by a committee, "ordered that wood-work for the boys of the seventh and eighth grades, . . . be introduced into the course of study just so far as adequate provision is made for instruction in these subjects. . . ." [309 : 134–137] Apparently the Board did not appropriate sufficient funds to carry out the proposed action, for Edward C. Eliot in his report says, "Owing to the generosity of a few private citizens, classes in Manual Training for boys . . . , were conducted in several of the higher grade district schools." [310 : 27] In the same year Superintendent Solden reports an appropriation of $6,000 to be used in manual training instruction during the year 1899–1900. He says, "The amount appropriated will be sufficient to continue, at the expense of the Board, the three rooms opened and maintained during the past year by the munificence of public spirited citizens, and to equip two additional rooms." [310 : 130]

Portland, Maine

The introduction of manual training into the grammar schools of Portland, Maine, during the year 1893–1894, was made possible by James P. Baxter, mayor of the city, who contributed his entire salary for the purpose. Rooms in two schools were fitted out with benches and necessary equipment to be used as centers for manual training classes. [304 : 9]

Springfield, Massachusetts

George Kilbon reports the attempts to start manual training in Springfield, Massachusetts, from 1878 when Milton Bradley arranged to open his shop to such boys as might wish to take up lessons in manual work to the time the city appropriated money to conduct

an experiment in manual training in connection with the public schools. In 1883, seventeen public-spirited citizens had attempted to establish a school of art and industry but were unable to raise sufficient funds to carry out the project. The real beginning came in January 1885, when a mother who was interested in having her son learn the use of tools approached J. R. Smith, superintendent of the Springfield Iron Works, to ask him where it would be possible for the boy to get such instruction. Smith promised to provide a teacher and a room for instruction if she could find nine boys who would be interested. In the meantime, the press had received word of the project and instead of nine boys reporting to take the lessons there were forty. So satisfactory was the course that when the time came to start the lessons again in the fall, the group had grown to a size that required an enlargement of the plans. The school committee, taking hold of the project, petitioned the city for an appropriation of one thousand dollars to carry out the experiment in the public schools. After a hearing, the appropriation was granted for the year, and with it manual training became a recognized course in the public schools of Springfield. [159 : 111]

No doubt, a study would reveal that manual training started in many cities because of certain determining factors similar to those in Springfield and in some of the other cities which have been mentioned.

PURPOSE OF MANUAL TRAINING

The stated objects of manual training in the various cities lean toward the development of tool skills and vocational preparation. Among the numerous objects listed, the following are characteristic: to teach practical knowledge and skill; to develop skill in the use of tools; to prepare for employment, to train hand and eye; to develop the mind; to train the faculties; to give discipline; to build character; to develop a respect for labor; and one city states that the aim is "to create such an interest as will force the pupils to forget any inclination to mischief or insubordination." [230 : 171] Lowell, Massachusetts, presented the most extensive array of objectives, ranging from the purely physical to the moral. [280 : 48] The practices reported along with formal required courses in tool

processes would tend to show that the one object, developing of skills, was not being neglected.

VALUES OF MANUAL TRAINING

Numerous values were claimed for manual training. The one principal claim was the value of the work as vocational guidance. Not only was the claim made then, as it is now, that the experiences in the shop would materially aid in vocational choice, but it was held that these same experiences would be beneficial in adjusting one's self to a new position when necessary. Quite in keeping with this belief was the idea that work in manual training would bring about more rapid progress in the trades, and that such training was valuable to all regardless of their future occupation. Familiarity with tools and a degree of skill were other values pointed out in relation to the vocational benefits. Even the nature of the work was supposed to foster a higher appreciation of the dignity of labor.

Among other benefits claimed was the forming of desirable traits and habits. This, with the development of the faculties, was supposed to promote observation, judgment, attention, and good habits of work. Such other values as an aid to other subjects, character building, desirable physical effects, and a means of promoting good order and attention had a goodly number of supporters.

MANUAL TRAINING COURSES

Quite significant during the period 1885–1894 is the movement away from the strictly bench woodworking courses typical of the previous period. The kinds of courses and the number of schools offering them are evident in Table I.

The courses listed as benchwork, cabinetwork, and woodworking might well be grouped with the courses listed as carpentry, for they all involved some form of bench woodwork based on joinery. Even though this be done, the number of cities offering this form of woodwork will be fifty-eight, or 80.5 per cent of the number of cities offering manual training work to pupils of the secondary schools, thus indicating a tendency away from the medium of wood which was universal in the preceding period. An examination of

TABLE

MANUAL TRAINING SUBJECTS OFFERED AND NUMBER OF

	Bench-work	Cab-inet-work	Car-pentry	Forging	Ma-chine-shop Prac-tice	Mold-ing	Pat-tern-mak-ing
Number of cities teaching	14	1	55	19	19	15	26
Per cent of cities teaching	1.4	1.4	76.0	26.4	26.4	20.8	36.1

the table shows an increase in the number of courses taken from the field of metalwork trades. Some schools were offering courses in paper cutting and folding, and clay-modeling as manual training work to pupils of the secondary schools, but the major portion of the activities was in woodworking and metalworking.

DEVELOPMENT OF DRAWING AS A SUBJECT

During the period from 1874 to 1884 only three of the ten schools offering manual training courses were found to be giving some form of drawing as a subject. In the period from 1885 to 1894, 84.7 per cent of the seventy-two schools offering manual training courses on the secondary school level report teaching freehand drawing and 88.9 per cent report teaching mechanical drawing. [210 : 2097–2113] Drawing had been one of the earliest forms of industrial training to be included in the curriculum of the public school systems of some states. The public schools of Massachusetts had received legal authority to teach drawing in the public schools during the year of 1860 [197 : 39], but it was not until 1870 that it became mandatory for designated cities to provide instruction in drawing. During the year of 1869, a group of men, claiming to represent every branch of manufactures in which the citizens of Massachusetts were engaged that required a knowledge of drawing and art design, petitioned the General Court of the State of Massachusetts to direct the Board of Education "to report in detail to the next general court some definite plan for introducing schools

I

CITIES OFFERING THESE SUBJECTS IN 1893–1894. [159:111]

Printing	Sheet Metal	Sloyd	Vise-work	Wood-carving	Wood-turning	Wood-working	Paper Folding and Cutting	Clay-modeling	Venetian Iron-work
1	5	18	21	37	38	1	15	15	1
1.4	6.9	25.0	29.2	51.4	52.8	1.4	20.8	20.8	1.4

for drawing or instruction in drawing free to all men, women, and children in all towns of the commonwealth of more than five thousand inhabitants." [197 : 52] These petitioners assigned as their reason for the request the handicaps under which they were working in competition with foreign countries where drawing and design were being taught in the public schools, and stated, "At the present time no wide provision is made for instruction in drawing in the public schools." [197 : 52] The Board was impressed with the importance of the problem and appointed a committee to investigate. By the next year public opinion had crystallized and the following act with reference to drawing in public schools had been passed:

Section 1. The first section of chapter 38 of the general statutes is hereby amended so as to include drawing among the branches of learning which are by said section required to be taught in the public schools.

Section 2. Any city or town may, and every city or town having more than 10,000 inhabitants shall, annually make provision for giving free instruction in industrial or mechanical drawing to persons over fifteen years of age, either in day or evening schools under the direction of the school committee. [197 : 40]

Professor Walter Smith was called from England and proceeded to stimulate an active interest in art education during the next few years. Clarke is of the conviction that the introduction of drawing in the State of Massachusetts was an important factor in precipitating the manual training movement. He says,

> One of the most striking and significant results of the experiment begun in Boston in 1870 by the teaching of industrial drawing to the public school children of that city has been the wide spread interest awakened throughout the United States in the further development of the industrial training of children. [197 : ix]

Two other states soon followed the example of Massachusetts in promulgating laws for the study of drawing in the public schools. Warren Johnson, State Superintendent of Common Schools in Maine, recommended the introduction of drawing into the public schools in his report for 1870. [197 : 297–298] In 1871 the Legislature enacted a law permitting any city or town to make provision for free instruction in industrial or mechanical drawing. [197 : 298] In 1875 the Legislature of New York passed an act requiring that instruction in industrial or freehand drawing be given in normal schools and city public schools. [197 : 306]

An examination of the statistics of the fifty-two cities offering manual training courses in 1893–1894, which had reported the dates of introduction of both drawing and manual training, show that 52 per cent of the cities had introduced drawing previous to the introduction of manual training, and 3.8 per cent had introduced manual training during the one year previous to the introduction of drawing courses. The remaining 44.2 per cent of the cities report introducing drawing and manual training during the same year. In those cases where drawing had been introduced first, it had been included in the course of study from one to twenty-two years, with a median of eight and one-half years, before the introduction of manual training. [210 : 2097–2113] These facts would tend to indicate that the early emphasis on drawing had already won for it an established place in the curriculum before manual training was accepted as a subject by educators.

Many of the schools teaching manual training, especially the manual training high schools, patterned their courses after such pioneer manual training schools as the School of Mechanic Arts at the Massachusetts Institute of Technology or the Manual Training School of Washington University where drawing was stressed throughout the entire course, one-third of the time allotted to manual training being devoted to drawing. Woodward, who was

looked upon as an authority in manual training, had published his book, *The Manual Training School.* In this book and in much of the literature prepared by him and in many of his speeches made throughout the country, he advocated the inclusion of drawing in the manual training courses if they were to survive and have real educational value.

METHOD

The teaching of tool processes by means of a graded sequence of exercises typical of the Russian system continued to dominate school-shop practice largely during the early part of the period from 1885 to 1894, although there were a few localities where the tendency was to teach these processes through the making of articles of utility. The practice of having pupils learn tool procedures through abstract exercises appears to have been more pronounced in the courses in carpentry and machine-shop practice. The other courses usually included a series of preliminary exercises in tool processes followed by application of these processes in articles of utility. This tendency to base the course of study on the exercise appears to have been more marked in the distinct manual training high schools than in the schools where manual training was considered another subject in the curriculum. In some of the manual training schools, all work of a constructive nature was postponed until the third year when the pupil worked out his required project for a thesis. Emphasis throughout the first two years was placed upon right principles and methods of tool processes rather than upon any finished product, because of the conviction that through any other procedure manual training would cease to be educational. [303 : 114] The principles were thus taught by means of specified progressive units. The following extract under the caption "Method" quoted in *Art and Industry* from an eight-page quarto sheet entitled "Manual Training" gives the practice in the Cleveland Manual Training School and is typical of the other manual training schools:

> The pupils all pass through the same course which is progressively arranged, so that each department may be considered a preparation for the next. The pupil begins with the simplest tools and work, and passes

by degrees to the more complex and difficult. The aim in each department is not to teach the boy to construct any special object, but to make such pieces as will enable him to master as quickly as possible the different processes. [198 : 440–441]

While these schools emphatically disclaimed any intention of developing tradesmen, nevertheless a strong emphasis was put upon the skill aspect of the work, although not all of the schools went to the same extreme as Lowell, Massachusetts, where it was required that the model be complete in every particular or the pupil had to do it over. [281 : 23] Goss, in speaking of practice in beginning woodwork, expresses the point of view of many shop teachers of the period when he says:

> Here it is necessary to demand attention and insist that method shall be the order of the day. Thus during the most of our course in bench work in wood, it will be found best to hold the student to work out the will of the instructor in every detail. Having once brought him to a proper understanding of the problem, much more latitude may be given. [148 : 266]

Trend toward Problems of Utility

During this same period there is a noticeable trend toward incorporating problems of utility into the manual training courses. Exercises in tool processes still continued to be stressed in the early part of each course, but the fundamental principles were later applied in making useful articles toward the end of the course. [257 : 167–168; 312 : 109; 198 : 392–395, 441–442] The number of articles having a utilitarian value included in the required course varied from one in New Haven, Connecticut [291 : 103–109], to an entire course devoted to the making of useful articles in Omaha, Nebraska. [198 : 430]

The situations in the two places cited were quite the reverse from what might have been expected. The reader will recall that when manual training first started in New Haven, Connecticut, it was taught by two janitors in their respective schools and at that time reference was made to the number of useful articles made by the pupils taking the course. In the fall of 1886, "John Pursell, a practical mechanic and designer with some experience in teaching, was

employed to give instruction." [291 : 47] With the employment of a full-time teacher came a noticeable difference in practice; a systematic course of lessons in tool processes and elements of carpentry took the place of the construction of articles of utility. [291 : 48] The first twenty-three lessons of the course were given over to exercises, after which nine lessons were devoted to application of the principles learned in making a small box with dovetailed corners and trimmed with a handmade molding. [291 : 103–109] No reference to exercise work in the Omaha, Nebraska, Manual Training Department appears in any of the early reports that were examined. Inasmuch as Baumann, the instructor, was a graduate of the St. Louis Manual Training School where considerable emphasis was put on the abstract exercise, the writer expected to find him stressing the exercise method. Apparently he went to the other extreme in his teaching practice for the second report of the committee on manual training states, "Various useful pieces of work were constructed, the pupils deciding for themselves what they would make." [198 : 430]

The inclusion of the making of useful articles in the manual training courses, in some localities, appears to have been brought about through a desire to make the work more interesting to the pupil. The manual training committee reporting on manual training in the English High and Manual Training School in Chicago, Illinois, in 1894 said,

> The main feature of the shop work during the past year has been an effort to bring the work more closely to the student. To accomplish this we have discarded attempts to make the large objects so common in manual training schools, and displaying but little individual work, and have turned attention to making and finishing many smaller objects which the pupil can complete for himself to take home as his own property. [263 : 113–116]

Kilbon states that the inclusion of useful problems was "arranged in the infancy of manual training when public suspicion of the value of the New Education made it seem necessary to teach the construction of articles of common use as a means of obtaining pupils." [13 : 3] This situation may have been a factor, but it is more than likely that a growing appreciation of the need for greater considera-

tion of pupil interest for purposes of motivation was a larger contributing factor.

Pupil Selection of Problem

Several schemes were in vogue when the making of useful articles was becoming a part of manual training work. Eau Claire, Wisconsin, allowed pupils opportunity on Saturdays and holidays of doing little jobs or making something in which they were interested. [198 : 204] In other cities, the pupil was permitted to make useful articles for himself after the required course of abstract exercises had been completed [268 : 101–102; 287 : 25; 321 : 82; 230 : 154]; however, even in this practice there was considerable latitude. The pupil who had completed the required course in manual training, in the Orange, New Jersey, schools might do some woodcarving or cabinet-making, but whatever he did was from special lessons assigned by the instructor. [230 : 154] On the other hand, the pupil in Cleveland, Ohio, was given some leeway in the selection of the article he should make for himself when he had completed the minimum course requirements. Since the course was set up so as to allow even the slow pupils to complete their work, in some cases it gave as much as four weeks in which the pupils could work on problems of their own selection. [268 : 101–102]

Two other procedures where pupils were permitted to work on useful articles are mentioned. The 1888 report of Decker shows the first year woodworking course to have been organized upon the plan of nine exercises in elementary processes or common operations of woodworking; eighteen exercises in joinery; followed by seven lessons in actual construction of useful articles involving application of the preceding exercises. [282 : 104] During the last half of the second year, the course was organized somewhat upon the basis of permitting the pupil to design such useful articles as he wished to make. These designs, in all cases, had to be approved by the instructor. [282 : 104] A somewhat similar policy was in practice at Hoboken, New Jersey, where "the last two months of the course were devoted to the manufacture of various separate articles of daily use. . . ." [230 : 171] Considerable leeway was given the pupils in the selection of a problem. "The pupils were

given the liberty to choose anything practical to construct. . . ." [230 : 171] Turney, reporting on manual training in Springfield, Illinois, says, "At certain intervals pupils are permitted to construct useful articles for themselves. . . ." [314 : 44] Kilbon states that during the month of December boys are encouraged to manufacture articles of their own design. [317 : 69] The freedom of choice in the selection of a problem is reported in Fall River, Massachusetts, in the fourth year cabinet-making course of the manual training school. "This work is made original as far as possible, and it is intended for individual judgment in shaping and sizing of parts, and in joining together various portions of a finished article." [272 : 68] St. Paul, Minnesota, followed a modified plan, somewhat similar to one already mentioned. There the shopwork of the seventh grade was devoted to tool processes and fundamental principles of joinery, the shopwork of the eighth grade being devoted to the making of useful articles and pieces of scientific experimental apparatus. [312 : 109] Webb reported letting the pupils make a single useful article near the end of the term to add interest to the work. [313 : 43] The 1893 report of the Jamestown schools states that in the advanced work of the senior grammar grade, "Opportunity is given the pupil to select or design a piece of work and construct the same." [278 : 35]

Production Work

Not all the articles of practical utility made in the schools were for the individual use of the pupils. A number of the articles were pieces of equipment for various departments in the school systems. Then, as now, certain school administrative officers looked upon the school shops as a means of getting articles needed in the school system made cheaply. [260 : 43] Howland mentions bookcases, tables, and principals' desks made in the manual training school of Chicago. [260 : 43] Gymnasium equipment was made in the Springfield, Massachusetts, manual training department. [316 : 23, 73] The Washington manual training school [319 : 39–40] and the Cambridge manual training school [257 : 179] report the making of articles of practical utility for the schools. The Philadelphia Manual Training School states "that the apparatus needed in the

physical department is made by the boys themselves. The electric lights, also, in the workshop, and the clever device by which the clock at certain hours will tap the bell for change of work, have also been arranged and put in by the boys themselves." [236 : 276–277]

Correlation

The form of production work mentioned in the preceding paragraph may well be thought of as correlation of manual training work with the work of other departments. Morris reports the attempt in Minneapolis, Minnesota, to correlate manual training with the other departments and especially with the departments of mathematics and philosophy. [283 : 120] In an address before the National Education Association, Bennett, speaking on the point of correlation, said,

> Manual training, in the judgment of even its more conservative advocates, is a unifying element of the highest value in a course of study. It acts and reacts on the other studies of the curriculum, and helps to establish among them a fellow-feeling which too often does not otherwise exist. Manual training when properly taught should and does bring drawing, arithmetic, geometry, geography, and language into warmer sympathy with one another. In all these lines it stimulates the pupils to greater interest and greater activity; for it puts a new meaning into much of their study, and helps to give a real significance to all of their work. [141 : 452]

Correlation within the manual training departments was common practice, especially between the shop and drawing classes. In the manual training high schools where a project for a thesis was required, patterns were made from drawings prepared by the pupil, the patterns were molded and cast by him in the foundry, and later he machined them to size in the machine shop. [262 : 120–122] Where forging and machine-shop practice were taught in the same school, it was common practice for the pupil, while completing the required course in forging, to make the chisels, punches, and lathe-cutting tools that he would later be using during the course in machine-shop practice. On the whole, a higher correlation was to be found between the several studies of the department than between these studies and the other school studies.

Dictation

An announcement on manual training in Jamestown, New York, under the name of Samuel G. Love, includes the following comment: "The methods of industrial training, it may be stated in general, are the same as those employed in teaching other subjects; that is, by direction, instruction, and repeated effort by the learner." [328 : 75] Direction amounting almost to dictation appears to have been the accepted practice. Only in a few cases, some of which have already been mentioned, were the pupils permitted to attempt to work through their problems by themselves. The desirable outcome seems to have been a pupil who could follow directions rather than one who could think through a situation for himself. Parmenter says, "Full specifications are always given, and no effort is spared to secure the greatest practical accuracy of execution." [257 : 158] Turney makes the statement that "All the articles are required to be of precise forms and dimensions given in a drawing made by a pupil himself, thus training him to habits of exactness in every particular." [314 : 43] Reference has already been made to Lowell, Massachusetts, where the model had to be complete in every particular or had to be done over. [281 : 23]

These few illustrations sum up in a general way the formal, inflexible point of view of one movement of the period. The instructor, in assigning the task to be done, used some form of sketch, blueprint, or model. The pupils made copies of the instructor's sketch or drawings of the model and after a demonstration proceeded to the bench, forge, or machine to follow the precise dimensions indicated. Spaulding, reporting to State Superintendent Chapman on the practice in Montclair, says, "In the clay, carpentry and carving a finished sample is shown to the class and they are required to make the same under instruction from their teacher." [229 : 55]

Cole, reporting on the practice in Albany, New York, says, "Our course of procedure in instruction is briefly this: The drawing teacher exhibits an object to the class; the pupils make a working drawing from the object, carry the latter to the shop and from it reproduce the object in wood." [231: Appendix p. 95; 241 : 45; 305 : 72; 320 : 131]

In some cases the pupil was provided with a drawing so that it was not necessary for the boy to take time from shopwork to make a drawing. [325 : 52; 302 : 102]

Demonstration

The next step in the dictation plan, after the pupil had made a drawing or had been provided with one, was the demonstration. Woods succinctly states this procedure as follows: "Each exercise is preceded by the necessary explanation of the tools to be used, how used and cared for, and all needed directions for performing the work properly. . . ." [273 : 52]

The statement of shop instruction in the Manual Training School of Washington University [337 : 60–61] was widely circulated and often copied in numerous city school reports as a statement of the method of instruction in manual training in those cities. [198 : 414; 314 : 43; 324 : 51] The Boston Mechanics Arts High School equipped shop rooms with a demonstration bench and an amphitheatre where classes might be called together for instruction. [251 : 316] Likewise, demonstration appears to have been the important teaching device in Cleveland, Ohio. The teacher had a bench of his own so situated as to allow space for the class to assemble in front of it: "Here the instructor calls the class together, explains the construction and use of each tool and the methods of laying out work, and instructs them in regard to the selection of wood, its shrinking, warping and checking." [198 : 441]

If this procedure were actually observed in these cities, the pupil had little left to do but follow the directions and contend with the vagaries of his material and tools. With such detailed information in regard to the procedure to be followed, it is difficult to square that part of Wood's statement where he says, ". . . the aim constantly is to lead the pupil to think out for himself the proper mode of procedure. . . ." [273 : 52] Likewise, the writer questions how a practice which planned each intricate detail for the pupil could be likened to a life situation, as Sayre contends when he says: "It must ever be kept in mind that the predominant element in manual training is mental development, and that the pupil is taught to deal with real problems in the same way in which

he learns to deal with similar problems when he comes to assume the responsibilities of life." [303 : 114]

Lecture

Several city school systems, other than the cities mentioned as following the plan of instruction of the Manual Training School of Washington University, report the lecture as one of the methods of instruction. These appear to fall into three classes. First is the type of lecture which seems to be no more than another name for the shop talk which might go along with the demonstration and give orally information in regard to tools, processes, or materials. [261 : 58–59; 279 : 106–107] Next are short talks or lectures introduced during the course bearing upon practical subjects closely related to the individual lesson they are intended to accompany. [319 : 39–40; 305 : 72] Closely related to the latter was the experiment of Wood in St. Louis, Missouri, when he had skilled workmen from various trades appear before the manual training classes at designated times during the year and "give lectures and practical talks on woods and metals." [307 : 75] Wood, in commenting on the experiment, stated, "The idea has proven a valuable innovation." Berlin, in his report for 1890–1891, advocates a more extensive use of lectures illustrated by charts, maps, and specimens as a means of presenting certain types of material to manual training classes. [324 : 66] Goss, in 1885, reports using illustrative material as an aid in instruction. He says, "In the classroom under the head of supplementary instruction, the various bench tools are taken up, explained and discussed. To assist in this, there may be employed besides the tools themselves, blackboard sketches, enlarged models showing form of cutting edges, and sectional models showing arrangement of parts." [148 : 263]

Waite speaks of lectures in the Toledo Manual Training School being "illustrated by means of lantern slides whenever desirable." [190 : 21]

Models

The extent to which models entered into the shop teaching would be difficult to estimate from the information the writer has been

able to gather. As has already been stated, a number of schools had the pupils make the drawings for their work from models, but whether these models were placed about the shop for reference, as was found to be the case in the School of Mechanic Arts [223 : 159], the writer is not prepared to say. Katherine Whitman suggested the use of specimens of the best work of the pupils as a means of stimulating other pupils to do better work. [299 : 55]

Pseudo Exercises

The practice in the Manual Training School of Washington University, of having the pupils in forging first perform certain exercises upon lead before working with the heated iron or steel, appears to have influenced a continuance of such practice in several of the public manual training schools where forging was taught. [337 : 62; 198 : 422; 271 : 45; 268 : 102; 279 : 107]

Excursions

The use of excursions is again reported during this period. Baltimore [246 : 168], Philadelphia [302 : 133–34], and Toledo [190 : 21] utilized the device of class visitation to various industrial institutions as a means of helping the pupil better understand the several processes of manufacture. Some of the excursions were motivated through special English assignments in which case the pupil was permitted to select his own industry for investigation.

Tool Cribs

Three new teaching devices in manual training made their appearance during this period; one was the use of lantern slides by Waite, already referred to, and the other two had to do with methods of class organization. The Cambridge Manual Training School had its woodworking and metalworking rooms equipped with tool cribs from which tools were issued to the pupils. Certain general tools were kept in trays and these trays were issued to the pupils at the beginning of the period. Each pupil had ten checks issued to him with which he might draw the tray of general tools and such individual tools that he might need. [257 : 143–144] This practice was rather unique at this time because the common practice

was to keep the tools either in racks on the benches or in the drawers of the bench.

Pupil Foreman

Wood reports a new departure in class organization which he claimed was highly satisfactory. His plan was to take "those boys who show natural aptitude and superior constructive skill" and make them foremen. These foremen were "given special charge of the indifferent and careless boys." Their responsibilities did not end here because they were also to watch the weaker pupils and aid them with a timely suggestion wherever possible. Wood comments on the value of the plan by saying, "Coming directly under the immediate supervision of the Director, these foremen have not only assisted materially, but have themselves been incalculably benefited." [308 : 90–91]

Although this experiment differs somewhat from the foreman system practiced in many of our industrial arts classes today, it is clearly a forerunner of a present-day expedient in the case of large classes.

Class Method of Instruction

The class method of instruction was the method generally practiced during this period. An examination of the reports, literature, and courses of study written at this time shows a strong tendency to have each pupil work upon a problem identical with the problem of each other member of the class, although leaders in the movement had recognized individual differences in pupils from the very beginnings of manual training. In regard to this practice, Roberts states, ". . . it has been my aim to keep the class together, as much as possible, thus enabling each fully to appreciate the value of the separate steps taken in the execution of an exercise, and that each might derive the fullest benefit of the complete explanations to the whole class which it would be impossible to obtain from the necessarily incomplete help given by individual instruction." [269 : 37]

Richards, speaking on the necessity of class method of instruction, says, "By this means and this means alone, can a class be

kept together, the instructor's strength economized, and the most efficient results secured. Unless this method is followed, the pupils soon become scattered, each is working upon a different operation, and the instructor goes from one to another, giving one kind of advice here and another there, until his nervous strength is completely exhausted and his class demoralized." [175 : 105]

In an address given in 1892, Bennett said, "The course of study should be planned so that class instruction may be given. . . . There is a training acquired by the pupil in class instruction that cannot be given with the teacher's help alone. . . . the class instruction should be given because of its value to the pupil and because it greatly simplifies the problem of introducing manual training into the public schools." [141 : 452]

Devices Utilized to Keep Class Together

It would seem as though some teachers trained in or imbued with the principle of class method resorted to many devices in their attempt to keep the members of their classes together. Bennett recounts some of the devices that he observed on a tour through the cities of three eastern states. One device was to gauge the amount of work to be accomplished in a given period by the slowest pupil. Another device was to require pupils to put in extra time according to their needs if the work was not finished by a specified time. Other devices were: to excuse fast members from class until the slower members caught up; to give such supplementary work as repair work in the shop; to permit the pupil to work on a useful problem of the teacher's selection; and to require the fast worker to decorate his models when completed, while permitting the slow worker to leave his work plain. In one school the teacher had arranged two parallel courses, one of exercises and the other of useful problems. As soon as the fast pupil had completed an exercise, he was given a supplementary problem from the course of useful models involving the same process. [3 : 69–74] This latter method had the advantage of repetition and no doubt stimulated greater interest in shopwork for those who could work fast enough to do work in the supplementary group of problems. New York was one step in front of the first city cited by Bennett.

Superintendent Jasper says, "It has been the rule to advance just as rapidly as the average of the class will permit." The boy with above average ability was also penalized here. Although he might finish his work before the others, he was not permitted to take up any work outside of that grade but must do work of a character similar to that prescribed in the regular course.

Individual Instruction

Individual instruction was recognized as essential in many cases, but it was usually subordinated to the class instruction. Class instruction was given first and individual instruction was only to be resorted to in cases where additional help or direction was necessary. [175 : 105; 141 : 452] Katherine Whitman was of the opinion that, although there was a large amount of manual training teaching which could be done through class instruction, teachers needed to put more emphasis upon individual instruction. It was her belief that it was not enough to tell a child how to do a thing; the teacher should go further and oversee the work of each child to make certain he had a clear idea of what to do. [299 : 54] .

Textbooks

The writer is not prepared to say to what extent textbooks were being used during this period. Love advocates use of a textbook when he says, "The best result will undoubtedly be achieved when the young workman studies carefully in the book each lesson before he attempts to do the work. With the book in his possession he can be fully prepared for an intelligent trial with the tools before going to the shop; he will need less attention from the instructors and a larger class can be taught at the same time." [17 : xvii]

The writer was unable to find any direct mention of the book being used as a manual in the Jamestown schools. There is a statement in the 1893 report which reads as follows: "Pupils prepare and read written description of the process of making each exercise, which is to be corrected before the class." [278 : 35] Montclair makes reference to the use of textbooks in one report. The report states, "When it was possible to find anything written on the subject it was purchased and used as a textbook." [236 : 198]

If textbooks were not used in manual training classes, the reason cannot be attributed to the fact that textbooks for manual training were not in existence. *Wood Working Tools,* first published for the Industrial School Association in 1881, had been through a number of editions. Part of the book, *Industrial Education* by Love, published in 1887, could have been used as a text. *Bench Work in Wood* by Goss was published in the same year. The following year, *First Lessons in Woodworking* by Compton was published. During the years 1890 to 1893 the following textbooks were published: Sickels, *Exercises in Woodworking;* Kilbon, *Knife Work in the Schools;* Upham, *Fifty Lessons in Woodworking;* and Kilbon, *Elementary Wood Carpentry for Boys.* An examination of these books shows that, with one exception, they were largely process manuals, quite in keeping with the educational theory of manual training for that period. These books bear a strong resemblance to the job sheets and process books in industrial arts that have been placed on the market during the past fifteen years. So marked is this similarity that a person might easily ask, Can it be that industrial arts has completed one cycle and is starting the same thing anew? The book, *Knife Work in the Schools,* by Kilbon is more in the nature of a problem book, a forerunner of a type which was to become common in the industrial arts field.

Notebooks

The use of a notebook as a teaching device is mentioned in the Toledo school reports during this period. [198 : 421] Notebooks appear to have been used largely for filing drawings of articles to be made, together with the necessary instructions for their construction.

GRADE PLACEMENT OF MANUAL TRAINING

A further examination of the reports of the seventy-two cities teaching manual training to pupils in secondary schools shows 50 per cent to be teaching manual training courses other than drawing in the seventh grade; 54.2 per cent in the eighth grade; 79.2 per cent in the ninth grade; 66.7 per cent in the tenth grade; 55.6 per cent in the eleventh grade; and 41.7 per cent in the twelfth

grade. The ninth and tenth grades appear to be the most favored grades for the work, with approximately four-fifths and two-thirds, respectively, of the cities teaching it in these grades. The larger number of cities teaching manual training in these grades may have been due in part to the influence of a more or less widespread view that boys under fourteen were too young to do satisfactory work with tools. There was an equal sentiment that manual training work should start in the grammar school, inasmuch as many boys would drop out of school before reaching high school and it was equally important that they obtain as much knowledge of tools, materials, and processes as possible before going out into life occupations.

The ninth grade seems to be the focal point. If this grade is considered as being a part of the high school, then only 13.9 per cent of the cities were teaching manual training in the grammar grades, 33.3 per cent in the high schools, and 52.7 per cent in both the upper grammar grades and the high school. However, if the ninth grade be included in a junior high school grouping, then the number of cities teaching manual training in the lower secondary education group is doubled and the senior high school group is cut approximately one-half; or it is found that 27.7 per cent of the cities were teaching manual training only on the junior high school level, 18.1 per cent on the senior high school level, and 54.1 per cent on both the junior and the senior high school levels. [210 : 2093–2113]

TIME ALLOTMENT

A study of the time allotment for manual training in the seventy-two schools shows a range from one school [206 : 2105], where fifteen minutes per week was all the time allowed for manual training, to one [210 : 2105] claiming an allowance of nine hundred sixty minutes per week. Time allotments also varied considerably according to the subject taught. The minimum amount of time was devoted to paper cutting and folding, while the maximum amount is claimed for carpentry. The median time allotment during this period is found to be 152.2 minutes per week, or 42.3 minutes less per week than during the pioneer period. See Table II.

TABLE

TIME ALLOTMENT FOR MANUAL TRAINING IN

	Number of							
	15 to 29	30 to 44	45 to 59	60 to 74	75 to 89	90 to 104	105 to 119	120 to 134
Number of cases	1	8	4	12	6	21	2	31
Per cent of cases	0.4	3.6	1.8	5.4	2.7	9.5	0.9	14.5

SUMMARY

Several manual training departments were developed in this period under the patronage of private interests. The period witnessed the extension of the manual training high school idea. At the same time there is to be noted a significant increase in the number of shop activities offered in each school. Although various forms of woodworking continued to be extensively practiced, there is a noticeable growth in the number of schools offering courses in several forms of metalworking.

The Russian system of tool instruction characterized the courses in the manual training high schools. In a few cases opportunity was given to work on articles of utility after the first two years had been completed. Outside of the manual training high schools there appears to be a wide range of practices. Most of these schools continued to cling to the exercise. In some cases, the pupil was permitted to make some useful article, which the teacher assigned, after the exercises had been completed; in other cases the pupil might select the article himself. A few schools arranged the entire course on the basis of the useful model and permitted the pupil freedom in selecting the articles he desired to make. The inclusion of articles of utility in the courses in shopwork was no doubt influenced by a greater consideration of pupil interest. During the same period is to be noticed an increased emphasis upon drawing in connection with manual training work.

The class method of instruction continued to be the popular means of teaching. The individual method was recognized but was

II

SEVENTY-TWO CITIES, 1893–1894. [210 : 2093–2113]

Minutes per Week												
135 to 149	150 to 164	180 to 194	195 to 204	225 to 239	270 to 284	300 to 314	450 to 464	465 to 479	525 to 539	540 to 554	600 to 614	960 to 974
18	11	17	23	3	6	20	10	3	7	10	7	1
8.2	5.0	7.7	10.4	1.3	2.7	9.0	4.5	1.3	3.1	4.5	3.1	0.4

subordinated to the class method. Numerous devices were resorted to in attempts to keep the members of the class together. Some production work was done in several of the schools. Correlation was attempted both within the department and with other departments. Dictation was the usual form of teaching. The drawing or model of the object to be made was presented to the class by the teacher, who gave directions for making it and then demonstrated each of the new processes and tools.

Other methods and devices mentioned as being used in this period were the lecture, blackboard illustration, excursions, notebooks, and pseudo exercises. In addition to these, lantern slides and enlarged and sectional models are mentioned for the first time. One school reports an interesting experiment with student foremen, while another reports a new means of tool distribution. During the period, an increasing number of textbooks in shopwork were published.

The largest number of schools offered manual training courses in the ninth grade, with the tenth grade ranking next. In the matter of time allotment there is an extremely wide range from fifteen minutes per week to 960 minutes per week.

The stated objects of the work tend toward the development of trade skills and vocational training. Among the values claimed for the work, the values of vocational guidance and vocational preparation are commented on most frequently.

CHAPTER VII

THE SLOYD MOVEMENT

ANOTHER movement which played a part in determining present practices in industrial arts was the sloyd movement introduced into this country in the late eighties. Sloyd work was not entirely new to American teachers, for the famous Sloyd Normal School had been founded at Nääs, Sweden, in 1875, by August Abrahamson [161 : 7] with Otto Salomon as director. This school had attracted students from many countries, and numerous articles and books had been written and printed in English regarding the school and the system. In 1883, an account of Ordway's visit to some of the Swedish sloyd schools was published, together with translations that he had made of articles written by Otto Salomon and H. K. Kjennerud on the Swedish sloyd system. [224 : 163–213] Some years later American teachers of handwork had an opportunity to examine a display of Swedish sloyd work at the Cotton Centennial Exhibition at New Orleans in 1885. "The remarkable Sloyd work of Sweden was illustrated by a set of drawings of the Nääs models, . . . and by about 100 specimens of very nice woodwork, made by boys from eleven to fifteen years old, in the schools of Stockholm." [170 : 525]

SLOYD TRAINING SCHOOL

The first sloyd courses to command any great attention in this country were taught by Larsson in the Sloyd Training School established by Mrs. Quincy A. Shaw [44 : 788] and supported by her until her death. It was this same school that was later to become an important training center for teachers of sloyd.

Purpose of the School

In a paper read before the American Manual Training Associa-

tion at New Haven, Connecticut, Larsson, speaking of this experiment by Mrs. Shaw, said,

> It is an outgrowth of her work in establishing free kindergarten teaching in the public schools of Boston, and is regarded by her as a continuation of that work, animated by the same spirit and looking to the same results. [131 : 4]

A quotation, claimed by Arngrimsson to be an extract from the "Midsummer Report of the Sloyd School" for 1889, states that it was the intention of this school to demonstrate the principles of the Swedish method of manual training modified to meet American requirements. [44 : 788] Larsson also wrote that it was "the first aim of the undertaking . . . to provide an opportunity for the study of the Swedish System of Manual Training, and to test its adaptability to American needs." [132 : 1]

Adaptation of Sloyd to American Conditions

Though the sloyd system of manual training had proved satisfactory in Sweden, Larsson admitted that many of the models transplanted from the Swedish course were not suited to American pupils. One of the most conspicuous shortcomings, to his thinking, was the parallel course in drawing. [132 : 1] After a period of adjustment, he developed what he considered to be a satisfactory course.

PUBLIC SCHOOL EXPERIMENTS WITH THE SYSTEM

Larsson must have started teaching sloyd to classes from the Boston Public Schools soon after the Sloyd Training School started. In a pamphlet, "Sloyd as Adapted in Boston," in 1893, he related that "For more than four years, pupils from the public schools of Boston have been permitted to attend the sloyd schools for half a day's session weekly, . . ." [133 : 5] In 1893, Larsson claimed that eleven centers in Boston were using the sloyd system. [132 : 2] Seaver reported a large-scale experiment being carried on in the city of Boston in an attempt to determine whether the Russian or the sloyd system could best meet the needs of the grammar school pupils. [239 : 22–23] The experiment appears to have resulted favorably for the sloyd system because a "Sloyd Bulletin" stated:

The City of Boston, after years of experimenting with manual training courses for its grammar schools, now makes use almost exclusively of models from the Sloyd Training School, and the twenty-four teachers of woodworking in the Boston Grammar Schools are, with one exception, Sloyd Training School graduates or students. [131 : 28]

Chicago was one of the first large cities to try out this system of manual training. The school report of 1892 mentions the introduction of the sloyd system into three schools as an experiment. [261 : 60]

THE GROWTH OF SLOYD

The activities of the Sloyd Training School must have received some favorable comment and publicity for the Albany, New York, Committee on Manual Training in their report for 1889 recommended the use of the sloyd system in a proposed class in manual training for girls. [242 : 30] The system appears to have met with a ready response in this country. In 1893, Larsson reports the school had furnished more than thirty teachers and lists twelve cities where they were teaching. [132 : 2] Not all of these teachers were giving instruction in public schools, because four normal schools and one reformatory are listed. Another report by the same author (believed written in 1894) lists twenty-six cities in which the sloyd system of the Sloyd Training School was being taught. [133 : 11–12] This list likewise contains four normal schools, a reformatory, an orphan asylum, a school for the deaf, and a school for the blind. The *Report of the Commissioner of Education for 1893–94* lists eighteen schools, or twenty-five per cent of the seventy-two schools offering manual training classes in grades seven to twelve, as teaching sloyd. [210 : 2097–2113]

AIMS OF SLOYD

Larsson, in stating the aim of sloyd, says that it "is to provide for the harmonious development of children during the formative age from eight to fifteen." [134 : 10] The general aims stated by him were:

1. The teachers must be professional teachers, and not artisans merely.
2. The teaching must be systematic, progressive, and with the exception of certain class demonstrations, as far as possible individual.

3. Such work should be selected as will give the best physical development, through free vigorous movements.
4. The visible or material results should be in every respect the workers own effort . . .
5. The exercises should be applied on objects the use of which can be thoroughly appreciated by the worker. Each object should be simple, and of good form and proportion.
6. The course should include not only objects which can be made accurate by the help of testing tools, but also free-hand work which exercises the sense of form through sight and touch.
7. Special importance is attached to neatness, accuracy, and finish, to the love of good work for its own sake, and the development of independence. [134 : 11]

The sloyd system was patterned after the Swedish Sloyd taught at Nääs under the direction of Otto Salomon. [134 : 10] Salomon had divided the aims of sloyd into two classes, the formative and the utilitarian. The formative aims were:

(1) To instil a taste for, and a love of, labour in general.
(2) To inspire a respect for rough, honest, bodily labour.
(3) To develop independence and self-reliance.
(4) To train in habits of order, exactness, cleanliness and neatness.
(5) To train the eye and sense of form. To give a general dexterity of hand, and to develop touch.
(6) To accustom to attention, industry, perseverance, and patience.
(7) To promote the development of the physical powers.

The utilitarian aims were:

(1) To directly give dexterity in the use of tools.
(2) To execute exact work. [24 : 6–7]

An examination of these aims shows a strong similarity to the aims stated by some of the manual training schools employing the Russian system of manual training. The greatest difference to be found between the two systems is in the principles of method.

Principles of Method

The principles of method stated by Salomon were:

(1) The instruction must go from easy to difficult.
(2) The instruction must go from simple to complex.

(3) The instruction must go from the known to the unknown.
(4) The teaching must lay a good foundation.
(5) The teacher should possess educational tact.
(6) The teaching should be interesting in character.
(7) The instruction should be intuitive in its character, i.e., it should be given as far as possible through the senses, especially touch and sight.
(8) The teaching should be individual in character.
(9) The instructor should be a teacher and not a mere craftsman. [24 : 10]

Some of these principles may take on more meaning with a word of explanation. The first principle, to proceed from the easy to the difficult, did not refer to the complexity of the models but to the ease or difficulty of the exercises employed in making them, as observed by what the children regarded as easy. The same principle was supposed to apply to the order of the introduction of tools in the course. The first tool used was the knife because it was considered to be the easiest to employ and it was assumed all boys had some familiarity with it. The complexity of the problem was not determined by the number of pieces making up a model but rather the number of exercises involved in making a model. A model of one piece, because of the number of processes that were essential in the making of it, might be more complex than a model composed of several parts. The principle of proceeding from the known to the unknown might apply to tools as well as to exercises. [24 : 10–11]

Several principles were laid down as a means of accomplishing the aim, "to instil a taste for, and a love of, labour in general." The first of these was: "The models must be useful from the pupils' standpoint." This immediate practical application added something of educational value to the sloyd that is in direct contrast to the outcomes of the Russian system, whose end was so remote that pupils were unable to see any value in their work.

Whereas the theory of the Russian system was "instruction before construction" through a series of abstract exercises, the principle of the sloyd system was that "the work should not involve fatiguing exercises." Salomon believed the impelling educational force in sloyd to be interest, and to maintain this interest there

should be no preparatory exercises, all exercises should be included in the making of the model. His theory was to work from the concrete to the abstract. In the presentation of his first models in the course, he believed the pupil should work from the model because working from a drawing would be working from the abstract. He set up four stages of progression to be observed in the principle of proceeding from the concrete to the abstract. The first has already been mentioned: "The pupil should begin to work from the model. . . . *2nd.* The children work from the model combined with a drawing of it. . . . *3rd.* The children work from the drawing only. . . . *4th.* The children may be allowed to devise an object they would like to draw, construct a drawing of it, and then construct the object from the drawing." [24 : 22–23]

In order to stimulate interest and a love for the work, it was the conviction of Salomon that as much variety should be introduced into the work as was compatible with the aims of sloyd. He believed there should be variety in the kinds of tools, in exercises, in the size and shape of the models, and in the use of the models. For this reason he was willing that the pupil should progress to the next model when he had failed two or three times in attempting satisfactorily to complete one. He had a strong feeling that each model should be completed in as perfect a manner as possible.

One principle stressed as important from an educational point of view was that "the pupils must be capable of doing the work themselves." This necessitated great care in the selection of models. It was his conviction that the finished article should represent pupils' efforts only. Any article on which the pupil could not do all of the work had no place in the course. If at any time it became necessary for the teacher to show the pupil something about the work that would require the use of tools, he should do so on another piece of work. Art people still have this "hands off" point of view.

Two other principles listed to enhance a love of labor were that "work must be real work, not a pretense at it" and "the object made should become the property of the child." [24 : 17–28]

Another aim of sloyd that is of interest because of the contrast to the methods of the Russian system is the aim "to develop inde-

pendence and self-reliance." Salomon offers several suggestions for proceeding toward this end. In the first case, the class should not be so large as to interfere with individual supervision and teaching. Second, he would have the work of each child independent of that of every other child. Third, "the teacher must not tell or show too much." This principle is quite different from the Russian system whereby each exercise was to be demonstrated in full to the class before they proceeded to work on it. Salomon states, "It is of great importance that the teacher abstain from rendering actual assistance on the work itself. Better even that the child spoil the objects they are making, than that the teacher do part of the work." Elizabeth Woodward, in speaking of the methods in one of the Boston schools, implies that when a boy working by himself from a drawing or specification runs into a difficulty he is supposed to determine for himself what the next steps are. She said, "The teacher's part is only to see that the 'next thing' is done in the best possible way." [195 : 31] This is quite a different procedure from the Russian system, which dictated the proper order of steps from the very beginning. The fourth principle, "the work must accord with the capacity of the child," has already been commented on. Fifth, "the children should endeavour to discover for themselves, by experiment, the best methods of holding and manipulating the tools." This point also is in direct contrast with the theory of the Russian system, where the manner of using each tool was demonstrated to the class before the pupil ever put the tool to use. Salomon stipulated that the teaching of tools and their uses "should follow, not precede, experimental use of them by the children." [24 : 68] He would first give the pupil an opportunity to experiment for himself and after a sufficient time, if he had not discovered the proper procedure, he would show the proper way to proceed, preferably by a few helpful suggestions rather than by too minute details. He says, "It is very important that children should think and judge for themselves and not the teacher for them." [24 : 33] This last statement leads into his sixth suggestion that "the teacher should allow as much free play to the judgment of the child as possible." In this matter he allows for three stages in the program of the work. [24 : 33–34]

Larsson presented several principles of sloyd similar to those of Salomon, in a paper read at the International Congress of Education at the World's Columbian Exposition, Chicago, July 26, 1893. Two ideas which he stressed at that time were the cultivation of the aesthetic sense by selected models, and the use of models simple enough in construction that they could be drawn by the pupils themselves instead of having to be copied or traced. [162 : 600–601] Apparently these two points had been developed here in the United States, either by Larsson or by some of his associates. Miss Woodward, in referring to the Swedish sloyd at the time of its introduction into this country, said: "At two points the Swedish models were found lacking: they were not based upon drawing, and they were weak upon the aesthetic side." [195 : 31–32] Miss Woodward continued by stating, "Drawing is the first and greatest gain which has come to the Sloyd by transplanting." [195 : 32] Salomon had approved of drawing in the advanced sloyd work but had not required that it be done. In this country, we find drawing becoming an essential feature and a preliminary requirement before the pupil started construction. [162 : 601] Larsson also advanced two principles having to do with the physical development aspect of the work. "The progression of the exercises should be such as to secure constant and proportionate development of mind and body" and "The work should be of such a character as to admit of the best hygienic condition." [130 : Introduction] The first of these principles was also stressed by J. Liberty Tadd in his book, *New Methods in Education.* Working positions at the bench received considerable emphasis by both Salomon and Larsson. [24 : 49–60; 130 : 74–76; 133 : 8]

SLOYD COURSE OF STUDY

The course in sloyd developed by Salomon consisted of fifty models involving eighty-eight exercises. [24 : 82–89] The course prepared by Larsson lists fifteen models for the first year of preliminary sloyd and thirty-one models involving seventy-two exercises for the three-year course. The entire four-year sloyd course involved eighty-two exercises. [132 : Appendix; 133 : 18ff.] Josephine Woodward speaks about the exercises of twenty-eight

models in American sloyd representing approximately the same number of exercises as were involved in the fifty exercises at Nääs. She explains this apparent great change in the number of models as being due to the introduction of drawing into the American sloyd; that whereas in the Swedish sloyd certain exercises needed to be repeated in the wood, in the American adaptation many of these exercises could be repeated in the drawing. [195 : 32]

CONTRAST OF SLOYD AND RUSSIAN SYSTEMS

This new type of handwork proved a distinct improvement over the Russian system. The first and most prominent of the differences between the two systems was the insistence of the sloyd upon the use of the completed model rather than the exercise that was characteristic of the Russian system. The sloyd also gave greater prominence to form study, for certain models were introduced which required dependence upon the pupil's judgment of shape and proportion rather than relying on the testing tools typical of the Russian system. The sloyd also offered a greater variety of models, exercises, and tools, which tended to stimulate a greater interest among the pupils. Lastly, the sloyd leaders demanded trained teachers for sloyd work. [162 : 600–601] The leaders in the Russian system also had tried to stress the point that the teacher of shopwork should be a skilled teacher rather than an artisan.

The Cambridge Committee on Manual Training reported:

> Of the several systems of manual training, the Swedish or Sloyd, with some changes to adapt it to the American child, is the best. It admits a progressive advancement, and is better suited to the age of our pupils than is the Russian. [258 : 33]

Turney, in commenting on the experience with the two systems in Springfield, Illinois, said:

> . . . while the Russian system undoubtedly produces the best results technically, it fails to create and interest, but the Swedish system, Americanized, stimulates the creative faculty and tends to hold the boys in school. [315 : 27]

Superintendent Spaulding, of Montclair, New Jersey, in his report also favored the sloyd system for

> The weakness of this system (Russian) consists in its inability to interest and its lack of adaptability to young boys, who possess varying facility in the manipulation of hands and tools. On the other hand, Sloyd possesses an advantage, first, in its power to interest by means of a large and varied assortment of useful objects to be constructed, and, second, its adaptability to the individual at different stages of development. [232 : 329]

Mather questions the use of the Russian system. In his report he referred to the lack of sustained interest on the part of the pupils and to their carelessness or indifference to quality in their work in manual training. He believed "the system has left out of account a boy's nature, his love to accomplish something obviously worth doing, to produce something he can take home and use." [295 : 51]

It is not difficult to understand why the sloyd system was welcome in the grammar grades as a release from the Russian system. The reader will recall that the Russian system had been devised in the Imperial Technical School at Moscow, Russia, as a means of technical training for engineering students. Pioneers in the manual training movement in this country, many of whom were connected with engineering schools, conceived the idea that such a type of shop instruction was well suited to the mental and physical abilities of high school boys. A similar system of shop instruction was introduced into the two schools which were to be the prototypes for manual training high schools. The exercises of the Russian system were soon pushed down into the upper grammar grades because of the conviction on the part of educators that the manual training of the kindergarten should connect up with the manual training of the high school. [195 : 26] Inasmuch as these exercises had been designed for young men in engineering schools, it was obvious that modifications would be necessary if they were to be suited to boys of grammar school age. The necessary modification consisted "in substituting simpler exercises for the more difficult ones, and then rearranging the whole so as to secure easy gradations and logical development." [239 : 21–22] But these abstract exercises did not appeal to the grammar school pupil after the novelty had worn off; he was so remote from any application that he could not see the reason for developing the tool skills and

knowledges of processes. An attempt was made to maintain a greater interest by introducing a limited number of useful problems. Even so, the sloyd system series of exercises incorporated into useful articles from the beginning was a better answer to the problem of manual education in the grammar schools.

CRITICISM OF SLOYD

Although sloyd was readily accepted by many handwork teachers, several defects in the system became apparent shortly after it had been in use. Beardsley, while admitting Swedish sloyd was based on correct pedagogic principles, claimed it was "not applicable to the conditions found to exist in the American city, because their system had originated and developed among agricultural people." [265 : 62] Seaver believed "the weak point in the Swedish sloyd is its neglect of the working drawings." [239 : 22] Tadd also took issue with sloyd and criticized the unsuitability of the work for American youth because of the lack of drawing and the formalism of the work; although he did qualifyingly admit sloyd to be "the best of all amateur woodworking systems." [32 : 25–29] Harris and others of the National Education Association Committee on Exhibition for 1888 were of the opinion that sloyd had no value in developing the aesthetic interests of youth. [173 : 690] The reader should keep in mind, however, that Harris was one of the strongest opponents of handwork in school and in this instance was referring to the sloyd work in Sweden.

Anderson [1 : 187–188], Mays [90 : 87], and Struck [30 : 30] mention the formality of the sloyd system as being one of its defects. Mays says,

> . . . sloyd suffered from the inflexibility of its organization and the almost unvarying character of the models made. Like the Russian system, sloyd was too carefully analyzed and its special values were too well measured and defined. Too little room was allowed for individual differences and there was, too, some doubt as to the exact benefits to be derived from its use. [90 : 87]

Some of these defects may not have been due so much to possible faults inherent in the system as to the interpretation of the system by teachers who either adapted or adopted it. They saw only the

outward expression of the models rather than the principles which lay behind them. Larsson recognized certain shortcomings of the Swedish sloyd to meet the needs of American youth and immediately set about to remodel the course of models, but still maintained the sloyd principles. Salomon also made allowances for growth in his program. Although he was more bound by tradition than Larsson, he found it necessary to change and rearrange his models to suit conditions and situations. If other teachers had been willing to study the needs of their pupils and plan their courses accordingly, if they had considered sloyd as a system which could evolve the same as any other system of education, instead of merely adopting a series of models, which may have been satisfactory in one situation, though static in another, much less criticism of the system would likely have been heard. The crux of the difficulty appears to have been that too many teachers of handwork were trying to substitute a series of models for teaching.

Although the models employed in the Swedish schools were not acceptable to American teachers, the sloyd general scheme of making useful objects requiring all the skill of the Russian system found favor with them and there evolved from the two systems a so-called American system in which the model gave way to the project as the unit of course organization. [90 : 87]

SUMMARY

In order to determine its relative merits in comparison with the Russian system of manual training, sloyd experiments were carried on in many cities soon after the work had started in Boston. The sloyd system appears to have found ready acceptance in the grammar grades because it was better suited to the age of the pupils and because it made a greater appeal to their interests. The spread of the sloyd system may be considered very rapid. Five years after the Sloyd Training School had been established, one quarter of the secondary schools offering manual training work reported courses in sloyd.

The outstanding characteristics of the work were individual method of instruction, the useful model, and the encouragement of pupil initiative and self-direction. Although the sloyd system was

an improvement over the Russian system, if judged on the basis of modern educational philosophy, it was not without its critics. There were many who considered the system too formal, and pointed to the fact that in too many cases the sequences of models used was as inflexible as the sequence of exercises of the Russian system.

Some opportunity had been offered American educators to become familiar with the theory of the sloyd system of manual training previous to 1888, but it was not until the establishment of the Sloyd Training School in Boston, under the patronage of Mrs. Quincy Shaw, that attention was focused on the practice of the system. The original purpose of the school was to demonstrate the principles of the Swedish system of manual training and extend the handwork of the kindergarten through the grades to connect with that of the higher schools. Later, through the activities and influence of Gustaf Larsson, the director, this school became an important training center for teachers of sloyd.

Larsson found it necessary to make numerous changes in the original course of models introduced from Sweden in order to adapt it to the needs of American schools. Two of the most important changes were the development of a parallel course in drawing and an improvement in the design of the models.

CHAPTER VIII

THE ARTS AND CRAFTS MOVEMENT

ANOTHER movement contributing an influence to present-day industrial arts has been the arts and crafts movement. This movement, started in England by John Ruskin, William Morris, and others as a protest against the ugliness and bad taste characteristic of almost everything produced during the latter half of the nineteenth century, was an attempt to restore the spirit of craftsmanship and art in the production of articles of utility. The movement spread rapidly and many supporting societies were organized both in England and in the United States. Although the movement itself was destined to fail because it attempted to revive the former guild method of production, it did serve to call attention to bad design and construction in the trades and industries. [33 : 35–37]

PHILADELPHIA PUBLIC INDUSTRIAL ART SCHOOL

In 1880, Charles Leland placed before the Committee on Industrial Education of Philadelphia a system of manual training which he had been instrumental in successfully introducing into schools in England. [300 : 20] The Board of Education gave financial assistance to Leland in his effort to introduce handwork of an industrial nature and provided a room for the work in one of the school buildings. Classes were held for sixty to seventy pupils between the ages of ten and sixteen on two afternoons each week. The system of manual and industrial training thus introduced in the Public Industrial Art School was continued by J. Liberty Tadd upon the retirement of Leland.

Purpose of the School

The purpose of the school in the beginning was, "To demon-

strate the feasibility of making industrial education part of the training of the public school." [301 : 23]

Leland had known Morris in England [87 : 893] and because of his influence and that of his followers, emphasized the importance of art work in contributing to the general culture of the individual. [200 : 8]

Course of Study

According to the plan of the school, industrial drawing was made a part of the course of study. Different types of decorative work in the minor arts were taught and such activities as drawing, modeling, carving, leather work, and repoussé work made up the major portion of the course. [87 : 893] Leland considered the decorative arts as a phase of industrial life better suited to the age and nature of children than any of the trade or mechanical pursuits [200 : 29], although he did favor having the child do practical work whenever it was possible. He thought this was the natural arrangement for he says:

> This natural truth, that man develops the ornamental during the infancy of every race before the useful, is illustrated in every individual. The child who cannot as yet make a shoe or file metals or master a trade, can, however, learn to design decorative outside patterns, mould beautiful pottery, set mosaics, carve panels, work sheet leather and repoussé or emboss sheet brass. [200 : 7]

Tadd makes the statement that formal benchwork in wood had been attempted in the school for a few terms around 1882, but he recognized "the futility of these exercises as real manual training" and the old system of woodworking exercises was dispensed with for the system of decorative arts. [32 : 9] He was also opposed to most metalworking in the school because it was too mechanical. However, he did make an exception of wrought iron and such other metals as lent themselves to ornamental and artistic treatment. [32 : 336–337]

Method

The system inaugurated by Leland was quite a contrast to the Russian system just getting under way at that time. Unlike the

Russian system, it did not consist of certain definite branches. Instead, there appears to have been much freedom in the work for it was based on "learning how to design the patterns and then working them out in any material. . . ." [200 : 9, 13] Even in the matter of designs, Leland was opposed to copying. As soon as the pupil had learned to "draw a clean light line with accuracy and confidence" [200 : 10], he was expected to draw original freehand patterns.

Several features characterize the system as it was later developed by Tadd. Among the radical departures were ambidexterity and memory drawing. [32 : 5] The reason given for doing ambidextrous work was the coordination acquired. [32 : 48] The claimed purpose for memory drawing was the development of observation and the organization of ideas which were intended to replace the blind copying which had formerly been the practice in drawing. [32 : 16–23]

Constructive work and mechanical drawing were not to be attempted by the pupil until he had passed through this elementary stage of the system at about fourteen years of age. He had first to acquire "a certain dexterity of hand and accuracy of eye" and must have proved his ability "to draw, model and carve reasonably well" before he was considered to be "ready for tools and tool-processes and instruments of precision." [32 : 309] The construction was all handwork, for Tadd did not believe in "machine shop methods" and thought that only through handwork could the pupil experience the real spirit of craftsmanship. [32 : 306–310]

Teaching Devices

Several teaching devices were advocated as being particularly valuable. The demonstration was implied in the statement that "every tool should be explained thoroughly and its use made manifest in as many directions as possible." Notebooks and sketch books were recommended. In these books were to be placed descriptions of tools and their uses, and a sketch and a pictorial drawing of each exercise. [32 : 325] The use of models was considered indispensable for architectural work. [32 : 323] Excursions and discussions were also recommended. [32 : 32–33]

Like many other shop teachers, Tadd considered vocational guidance a valuable feature of the work. [32 : 12–13]

When the pupil reached the more advanced exercises, the work might be carried on individually, though it was suggested that the work should be selected according to the ability of the pupil. [32 : 329]

Rotation of Activities

One other radical feature developed by Tadd was the principle of rotation of work. Instead of the pupils in the elementary stage taking one course in a department and later taking another at a specified time, they were required to rotate work in the four departments of drawing, designing, clay-modeling, and woodcarving. The theory was that in working in the various mediums all the possible physical coordinations could be acquired and that working in one medium reinforced the ability to work in all other mediums. [32 : 5] It was during this elementary stage of the course that drill exercises were introduced to develop a general dexterity of the hand and an accuracy of the eye. [32 : 67–86] Rotation was also practiced in the advanced work. In this stage each pupil was expected to rotate his mechanical drawing and constructive work during each lesson. [32 : 315]

Correlation

Another feature of the system was the attempt to correlate the drawing with all the other school work. [32 : 52] Tadd was opposed to isolating drawing as a subject from the other studies. It was his conviction that this visual means of expression could be a force in making other subjects vital. Perhaps there was no more intimate and effective correlation in the system than that between drawing and nature study. [32 : 58–64] Likewise, in the advanced stage, the constructive drawing and the mechanical drawing were to correlate with each other and the benchwork must also correlate with the other studies or it had "no business in the schools." [32 : 319] One means of correlation was through related information. Lessons were given on the various kinds of materials, types of fastenings, and finishes used. Consideration was also given to

the use and application of different constructions. [32 : 325] To Tadd, manual training was not a mere method of using certain tools. It was a mode of thought expression that must (1) recognize the potential and creative capacities before anything else, and (2) provide for freedom of expression. [184 : 891]

Value of the System

Apparently Leland was a strong advocate of "learning by doing," for he says, "For all learning since books were invented there was never aught like experience, and of all experience there is none like one's own." [200 : 37] He had great faith in the system and believed it was well suited to fill the gap in the shopwork of the pupil between the kindergarten and the industrial school. [200 : 9] Furthermore, he implied that such a system gave a good foundation for leisure time activities either for the individual or for clubs. [200 : 37] Even before the sloyd system had been introduced into this country, so well did Clarke think of the Leland experiment that he said it "would seem to furnish a more practical model for similar instruction in American communities than any Swedish experiments would be likely to offer it." [197 : 70] Clarke continued further to the effect that "hand work in America, to be of any value, must be artistic. . . ."

The distinct emphasis placed on the aesthetic side of the school distinguished it from any of the early manual training schools. Although the school may have overemphasized the art feature of manual training, it had in many ways a modern philosophy of progressive education. Creative art found opportunity for expression because Tadd did not believe pupils' capacity to do original and creative work should be limited by set courses and graded exercises. [32 : 29]

INCREASING INTEREST IN ART AND DESIGN IN MANUAL TRAINING

Leland and Tadd were not alone in their desire to have art and design function as an integral part of manual training work. Carter, in 1886, recommended building the manual training courses around industrial drawing. [145 : 443–451] The Pennsylvania Commis-

sion recommended the introduction of drawing and design into all manual training courses for its educational value, its importance in developing a number of faculties, its use as an important link between the school and practical industries, and its influence in cultivating better producers and more appreciative consumers. [236 : 11] Seaver proposed to include freehand drawing and woodcarving in the course of the Mechanic Arts High School in order to provide for the aesthetic side of the work. [253 : 187] He also recommended some required exercises in ornamental ironwork in the forging course as well as their use as supplementary exercises. He would have the boy make his designs and then submit them to the teacher for criticism before starting to work. [253 : 188] Likewise, he would have the cabinet-making projects ornamented with woodcarving or ornamental ironwork, "not only to display acquired skill in workmanship, but also to bring into play the artistic feeling." [253 : 190]

Bennett, in an address in 1896, made the statement that "the aesthetic principle" in manual training "was of a comparatively recent origin." [142 : 786] At that time he remarked that the pupil was often more interested in the beautiful than in the useful, and continued by saying that if the teacher were "to plan a course of manual training in harmony with the child's natural interests and as richly educative as possible, he must place in his course pieces that are beautiful as well as those that are useful." [142 : 787] He indicates one reason for the lag in introducing the aesthetic element into the manual training work as being due to the conviction of many teachers that the pupil first needed to acquire a thorough skill in tools before he could produce results that were beautiful. This belief is discredited by Bennett, who claimed the child could make beautiful things at any stage of development, providing he were allowed to work with tools and materials that were adapted to his ability. [142 : 787–788]

Other leaders and teachers in the manual training field were urging more emphasis on the aesthetic side of the subject. Chamberlain alludes to the desire, during this period, "to give the work a higher artistic standard, to make it a better medium for inculcating and expressing art ideas." [323 : 141] Henderson expressed his

objection to the abstract exercises of the Russian system on aesthetic grounds and stated his desire that the projects of what he called the American system "might be made beautiful." [74 : 335] Runkle and Woodward had both strongly urged the inclusion of mechanical drawing in the manual training courses, but all the drawings were either copied or made from models, the purpose being interpretation of working drawings rather than original design. Abby Marlatt also urged a close relationship between the principles of construction and design. That she hoped such an outcome might result from the arts and crafts movement is evident when she said that "if the handicraft movement can induce in the schools a return to the utilization of the pupils' own initiative while yet accomplishing the basal principles of construction it will have secured a useful purpose in reuniting design and execution." [89 : 584–585]

Peyser, in 1902, cited the changing emphasis in manual training and called attention to the fact that where the aims had formerly been to impart ideas of method and accuracy, they were then to develop an appreciation of the proper use of materials so as to coordinate art and construction "to make the useful beautiful." [171 : 571]

OTHER INFLUENCES FOR DESIGN

According to some writers in the industrial arts field, the arts and crafts was not the only movement which exerted an influence for design in the work. Roberts implies that sloyd contributed much to the interest of design in the later manual training models. [178 : 57] Warner declares that the interest in design is easily traced back to the influence of Salomon and Larsson. [40 : 9] Miss Sarah Patrick, who was a student in the Sloyd Training School in 1901, seriously questions the influence of sloyd along the line of design because at that time the greater emphasis was upon the accurate execution of a rigid series of models. Miss Patrick states that the attitude of the sloyd teachers appeared to be that any digression from the set course would be a mark of disloyalty to the founders of the movement. [342 : Interview] This thought would appear to be borne out by a statement of Larsson in 1897, when he casually remarks about the pressure for art in manual training and

the pleas of the advocates that the articles made should have essentials of artistic worth. [161 : 12] Some time later the influence of these art protagonists is reflected in the *Sloyd Bulletin* which recommended that the teachers of sloyd and the teachers of art should work together in order that only objects characterized by beautiful design would be presented to the children. [137 : 14–17]

METHOD

Although the pupils in the New York schools were required to complete, in order, a number of designated exercises, these exercises were not expected to require the total amount of the time devoted to the course. During the remaining time, the pupil was expected to make some article of use which he had designed. [298 : 5] One of the principles deduced from the experiments in Chicago was that manual training should provide for "artistic development." [265 : 62] The importance of training the inventive and creative faculty was emphasized. The training of correct artistic tastes or the development of the creative faculty was to be fostered and accomplished by placing pleasing forms and designs before the pupil. From these forms he was expected to work out his own decoration. [265 : 62–63]

CORRELATION

Seaver advocated a close correlation between drawing and shopwork so that the "whole work of the drawing shops becomes one course of practice in the expression of ideas, through drawing and construction." [253 : Appendix, p. 187] Beardsley, in a report on manual training in Chicago, claimed a close coordination of the manual training department with all the other departments, with special emphasis upon the subjects of drawing and nature study [266 : 206], which was very similar to the earlier claim of the Philadelphia Industrial Art School. In 1903, Richards made the statement with respect to constructive work and art instruction, "One of the important correlations that makes towards greater vitality and fruitfulness is that between constructive work and art instruction." [177 : 281]

VALUE

Bacon expressed the opinion in 1904 that the arts and crafts movement was inspiring a sense of art in manual training work. [140 : 31] Vaughn and Mays, in speaking of the arts and crafts movement, said that it "made the manual training teachers conscious of the fact that there are such things as good taste, artistic ideals, beauty in simplicity, originality in design, and honest construction, even if it did not help them immediately to achieve such ideals." [33 : 37]

TERMINOLOGY

Haney suggested the term "manual arts" for this kind of work. Under this title he included all forms of drawing, construction, and design, thus acknowledging the intimate relationship existing between them. Not only did he define the term in the different branches in a general way but through its use he intended to emphasize "both the motor and artistic elements in their performance." [150 : 661]

SPREAD OF THE MOVEMENT

The aesthetic tendency was to persist throughout the beginning of the twentieth century. Evidence of this is to be found in the large number of papers read on the subject in the meetings of the National Education Association and the American Manual Training Association. The tendency is also reflected in the organization of associations like the Eastern Arts Association and the Western Drawing Teachers Association for teachers of both art and manual training. Likewise, it was reflected in the persistence of the arts and crafts movement. A series of articles of this nature appeared in *The Chautauquan* between September 1903 and May 1904, three of which dealt directly with the arts and crafts in relation to the public schools. [64 : 384–386; 57 : 487–491; 89 : 584–588]

INFLUENCE OF THE MOVEMENT

Thus it is seen that the arts and crafts movement ushered in the third stage of industrial arts work, later to be known as manual

arts. As a result of these influences, the products of the school shop became better adapted to the interests of American youth and for use in the American home. There was noted an increase in the variety of the products and a change in method from teacher dictation from a narrow specified list of exercises to models requiring some original thought and planning on the part of the pupil. With this change, there was also a noticeable shift in emphasis from the purely mechanical aspects of the work to considerations of beauty and artistic expression. Gilbert also expressed a new philosophy when he made the statement that there was another point of view to manual training than just the industrial side. On this point he said:

> There is the side of individual expansion to be considered; training in art through artistic work, the growth which inevitably comes from the process of creation, which is found in manual training more evidently than in any other department of school life. The child who has worked out a mechanical problem in his imagination until he has clearly seen the object to be made, has represented this in a drawing and then has ultimately produced it in some lasting substance, has enjoyed education of the highest order. . . . [286 : 39]

SUMMARY

One of the outstanding characteristics of the arts and crafts movement was the distinct emphasis put upon the aesthetic side of the work instead of the skill that had been stressed formerly. The increasing interest of manual arts teachers in design is evident in the number of papers and discussions on the topic in the reports of the National Education Association and of organizations for teachers of art and manual training.

During this period there is to be noted a movement away from teacher dictated exercises and models toward some freedom in allowing the pupil to select and design articles of personal interest. In some cases creative expression was permitted the pupil in several materials other than wood, iron, or steel.

Many of the teaching methods and devices, such as demonstration, discussion, excursions, models, and notebooks, were typical of the former movements discussed. During this period, however,

strong emphasis was put upon the correlation of drawing and construction work with each other and with the other school subjects as a means of motivating and vitalizing them. Rotation of the pupil through at least four types of work in the school shop was also a new departure in practice. It was during this period that the term manual arts was suggested as being more descriptive of the type of shopwork that was then becoming prominent.

CHAPTER IX

INDUSTRIAL MOVEMENT

ALTHOUGH the history of the Russian, the sloyd, and the arts and crafts movements indicates a trend toward the use of several forms of manual training for the purpose of cultural education, there is also evident a marked tendency toward a distinct demand for greater emphasis upon vocational ends.

FACTORS INFLUENCING THE MOVEMENT

Several agencies appear to have been responsible for promoting the movement. Leavitt cites:

> The desire of manufacturers to secure more efficient workmen without increasing the cost of production; the desire of organized workmen to prevent the flooding of the labor market with cheap and partially trained labor, and, at the same time, to secure for themselves and their children an education enabling them to resist exploitation; the desire of educators to develop a larger percentage of the children intrusted to the care of the schools to a point more nearly commensurate with their several native and peculiar abilities; and the desire of organized society, working for social betterment, to eliminate one of the most potent causes of crime and unhappiness, namely unemployed ignorance. [15 : 52]

To the factors already mentioned as influencing the trend toward vocational education, Anderson adds changes in methods of manufacture, the decay of apprenticeship, an increasing commercial competition, a progressive usurpation of the child's time by the school, and the tendency for children to become permanently fixed in some "blind alley" occupation. [1 : 200–201]

Many of the proponents of manual training had lent their support to the movement because of their belief that such training would contribute to the vocational preparation of pupils who would later enter into industrial pursuits.

REPORT OF THE MASSACHUSETTS COMMISSION

Shortly after the opening of the twentieth century, the agitation for vocational education again came to the front. The agency which seems to have been the most influential in precipitating a definite movement for vocational education in the public schools was the report of the Massachusetts Commission on Industrial and Technical Education. [15 : 17; 1 : 199] This report presents several of the conditions that gave rise to the vocational movement. The oft-quoted statement from the report, of which less than two-thirds of a page is devoted to manual training, criticizes the growth and results of manual training. This statement, from which the manual training advocate can derive little consolation, reads:

> The wide indifference to manual training as a school subject may be due to the narrow view which has prevailed among its chief advocates. It has been urged as a cultural subject mainly useful as a stimulus to other forms of intellectual effort,—a sort of a mustard relish, and appetizer, to be conducted without reference to any industrial end. It has been severed from real life as completely as have the other school activities. [227 : 14]

SCHOOL SHOPWORK AS AN ELEMENT IN TRADE TRAINING

Advocates, like Runkle and Woodward, who insisted that the chief purpose of manual training was general education and not specific vocational training were of the opinion that such work was valuable training for mechanical occupations. In this respect, Runkle said,

> . . . industrial education is rapidly coming to mean such a broad and general training, both in theory and practice, both mentally and manually, as will secure a sound, general education, as well as fit the student to enter upon any one of a large group of allied industries if he shall choose to do so. [182 : 56]

Woodward spoke in the same vein when he said,

> The object of the introduction of manual training is not to make mechanics. I have said that many times, and I find continued need of repeating the statement. . . . Our great object is education; other objects are secondary. That industrial results will surely follow, I have not the least doubt, but they will take care of themselves. [194 : 16]

Through the efforts of these leaders and others the vocational aspect of the work was subordinated to the cultural, and at times was suppressed altogether only to reappear at a later date. [90 : 88; 1 : 198] This claim of vocational value was not confined to the Russian system of manual training. Leland, in replying to a letter from Clarke, made reference to the vocational advantage of the work as he taught it. He made the claim that any child twelve to fifteen years of age could, after a series of two-hour lessons, take his place as a worker in industry where a knowledge of design or modeling was required. Furthermore, he claimed that the training the pupils received under his system fitted them to be expert buyers and salesmen, or if the pupil preferred, he could make eight dollars a week from the sale of his products. [198 : 738; 16 : 9] His successor, J. Liberty Tadd, also insisted upon the value of handwork in drawing, modeling, and carving as preparation for any of the handicrafts and claimed that

> the youth who has had this true manual training during the elementary schooling has already acquired more real skill of hand and eye than the apprentice working during the like period at trade processes only. . . . He will learn a trade and become a better workman in it in a few months than the ordinary apprentice would do in several years. [32 : 30–31]

Charles J. Warner took an opposite point of view and called attention to the limitations of the manual training school to teach trades, when he wrote:

> Our manual training high schools have been thought by some to be capable of furnishing this needed fundamental training in mechanical principles and practices. They undoubtedly do this to a limited extent; but as they are generally conducted, so much variety of mechanical instruction and so little practice in any one line are given that they can hardly be said to do more than give their pupils a certain appreciation of mechanical principles and processes. [227 : 188]

In his letter reference is made to a study of the catalogues of five leading manual training schools. The result of this study showed what an exceedingly small number of the graduates from these schools entered mechanical pursuits. [227 : 196]

During the time that manual training was the subject of educa-

tional discussions, various types of trade education were being developed, with the consequence that this trade work tended continually to call attention to the inadequacy of manual training as a means of vocational education. [90 : 88; 172 : 14–128]

Although Woodward had optimistically declared that "by multiplying manual training schools we shall solve the problem of training all the mechanics our industries need" [214 : 1039], the report of the Massachusetts Commission brought out the lack of skilled workmen in many industries. This deficiency was not confined to manual dexterity alone but included the more important element of a lack of "industrial intelligence." [227 : 4–5] Such a condition was evidently considered a failure of the manual training school to meet this need, because the Commission recommended that in addition to the elements of industrial training taught in the public school there should be set up distinctive industrial schools, separated entirely from the public school system, to further this elementary teaching. [227 : 23]

EFFECT OF MASSACHUSETTS REPORT ON EDUCATIONAL THOUGHT

The repercussions of the Massachusetts report soon became evident in the character of the addresses and magazine articles in the educational field. During the next two years, the topic of industrial education engaged the attention of educational conventions more frequently than any other single topic. "Furthermore," says Leavitt, "the discussion has been remarkable in that there seems to be but one opinion regarding the necessity for and the benefits to be derived from the establishment of a wise and far reaching system of industrial training." [163 : 778] What the school shop could contribute to this industrial training became of paramount importance.

The Report of the Committee on the Place of Industries in Public Education likewise clearly indicates the trend of thought toward vocational education. This committee of the National Education Association, appointed in 1907, presented its report in 1910, and like the report of the Massachusetts Commission on Industrial and Technical Education, expressed dissatisfaction with the progress of manual training. [174 : 4–6]

NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION

The influence of the National Society for the Promotion of Industrial Education was another important factor in promoting vocational school education. The purpose of this association, organized in 1906, "was to unite the many forces making towards industrial education the country over." [169 : 7] The organization, initiated by James P. Haney and Charles R. Richards, was later to have a marked influence on industrial arts in this country. Acknowledgment must be given this association for initiating the unusual piece of educational legislation known as the Smith-Hughes Bill. [90 : 89]

COOPERATIVE SCHOOLS

Near the end of the first decade of the twentieth century several schools adopted the cooperative system of education in an attempt to develop a plan whereby pupils would receive a training sufficiently practical to enable them to enter a trade upon graduation without any further period of apprenticeship. The plan closely resembled the one inaugurated by Dean Schneider in the department of engineering at the University of Cincinnati in 1906. Under the cooperative system an agreement was made between the school and cooperating industries to coordinate an educational program. The theoretical work was to be given in the school and the practical experiences were to be given in the industrial plants. According to this plan the boys were paired. One boy attended school for one or two weeks, while the other was employed by the cooperating industrial plant. At the end of the period the boys were rotated so that alternate periods were spent in school and industry throughout the four-year course.

The first experiment of this nature started in the high school of Fitchburg, Massachusetts, in 1908 and attracted wide attention. Similar plans were also introduced at Beverly, Massachusetts; York, Pennsylvania; Little Rock, Arkansas; and other places. [1 : 230] A number of cities must have been impressed by the practicability of the plan for Anderson says that "by 1912 cooperative courses had been organized in from twenty to thirty cities." [1 : 230]

CONTINUATION SCHOOLS

M. E. Sadler, in his book *Continuation Schools in England and Elsewhere*, traces the continuation school back to the Sunday school movement which began about 1780. The continuation school movement in this country appears to have developed following the Report of the Massachusetts Commission on Industrial and Technical Education in 1906. Although the report did not set up any plan for continuation schools, it did call attention to the need for furthering the education of the large number of children who were dropping out of school to enter industry.

The attention of those interested in solving the problem of industrial vocational education was attracted at about the same time to a well-organized system of continuation schools that had been developed in Munich, Germany, by Dr. Kerschensteiner. In 1910 Dr. Kerschensteiner was invited to this country by the National Society for the Promotion of Industrial Education to deliver a number of addresses on the subject of continuation schools under the auspices of the Society. [1 : 231]

Although a keen interest was shown in the continuation school plan, the *Sixth Annual Report of the Federal Board of Vocational Education, 1922* states that up to 1918 only two states, Wisconsin (1911) and Pennsylvania (1915), had enacted compulsory attendance laws affecting children between the ages of 14 and 18. According to this report the years from 1918 to 1922 witnessed a phenomenal growth of legislative support, for twenty-two states passed some sort of part-time legislation during this period which made it possible for the cities within the states to establish part-time schools.

The *Seventh Annual Report of the Federal Board of Vocational Education, 1923,* comments on the part-time schools as follows:

> In past years many part-time schools or classes have been of general-continuation type. In proportion as the problems of part-time education are becoming better understood, however, and better ways are being devised for meeting the needs of employed youth enrolled in such schools, the work is becoming more strictly vocational, with less attention given to general education as organized in grade and high schools.

METHODS

In 1906, Bennett said, "New discoveries precipitate new problems. New conditions necessitate changes in procedure. This is just as true in teaching as it is in scientific investigation or in business. Any change in public sentiment, any growth in ideals calls for a corresponding change in the teachers' work." [47 : 121] As early as 1901, Bryant had said that the methods of manual training should be thoroughly up to date and, in so far as possible, in agreement with the best modern manufacturing processes, in regard to both equipment and details of work. [56 : 204]

Soon after the report of the Massachusetts Commission the nature of addresses and magazine articles dealing with methods of manual training changed in tenor. One practice which immediately came to the front was to divide the class up into small groups with a pupil foreman in charge of each group to direct the group in following the methods of the trade world. Each group was to make one model and each pupil was responsible for making specified parts for the model from a prepared drawing. [116 : 211–212] Thus the emphasis in manual and industrial arts took the form of shop methods in the work. Group projects rather than individual projects became a popular method in the organization of the shop products. Because of the prominence given to the factory system, much emphasis was placed on the proper routing of material through the shops. [90 : 88] Prosser would go a step farther and have the school organized upon a productive basis, even to the extent of introducing the time element. He would have the work carried on as nearly like an actual shop as possible. Instead of having pupils work on articles for their own consumption, he would have them do production work for the school system. This he considered to be valuable as a guidance feature as well as for the knowledge acquired. [99 : 219–220]

Although the factory method of shop organization had many followers, it was not without its critics. Guillou challenged the method for the reason that from the time the pupil was furnished with a drawing of the article to be made, as a workman is given a blueprint, pupil initiative was neither encouraged nor was it consistent with the

method. Furthermore, he adds, "discrimination, judgment, and thought are suppressed, and imitation of the outward form is made emphatic." [149 : 759]

Crawshaw was another one of the advocates of making the school shop practical. However, he would not go to the extreme that Prosser proposed, although he did consider such work desirable educationally as well as vocationally. He thought it should not be practiced until after the elements in any form of shopwork had been developed and practiced in the so-called craftsman type of work. He believed factory methods in the school should further the education and not merely the training of the individual. He considered shop methods from the educational rather than from the economic point of view. [63 : 180–182] This is clearly stated in his book, *Manual Arts for Vocational Ends,* where he says, "Do all these things which manual training has sought to do in the past, but do one thing more to take it out of what some have called the dilettante stage of development—make it strongly vocational." [6 : 13]

That the production method of teaching industrial arts work continues to exert considerable influence is evident in a number of books on industrial arts education published since 1924. The number of pages devoted to this topic range from two in *Exploring the Manual Arts* [8 : 67–68] to ten in *Teaching Problems in Industrial Arts.* [7 : 158–168; 33 : 167–174; 31 : 40–43; 28 : 95–96, 114–117]

ARGUMENT FOR VOCATIONAL EMPHASIS

In 1913, Selvidge wrote that the vocational side of the manual arts had not been emphasized as much as it should have been and brought out the point that pupils need instruction in industrial methods and practices if they are to know how things that supply our wants are produced. To help the pupil understand modern production would require instruction in factory methods and practices in addition to the treatment of manual arts as a cultural subject. [110 : 415–416] Roberts, in 1911, believed the revolt of the advocates of industrial education was justified in a degree because the subject at that time had become to a large extent cultural. [103 : 361]

TENDENCY TOWARD VOCATIONAL EMPHASIS IN SCHOOL SHOPS

Ash, reporting on a study he had made of fifty-two of the larger cities throughout the United States, said, "The tendency in all these cities seems to have been to pass from the purely cultural aim of manual training to the more practical claim of industrial education." [126 : 4] Armstrong, in 1913, likewise reported a "growing tendency to put manual training on a practical commercial basis. . . ." [43 : 105] In the article referred to he relates how he organized his manual training department into a real manufacturing establishment with offices, shops, and subsidiary divisions. [43 : 105–109] Larsson also refers to the tendency to introduce factory and industrial methods of work into the schools for the purposes of industrial preparation. [82 : 230] In 1919, Roberts writes of the tendency of industrial arts work toward production on a quantity and commercial basis for the purpose of meeting school and community needs as well as the needs of vocational guidance. [104 : 119]

Following the passage of the Smith-Hughes Bill, many school systems made claim that they were providing vocational training in their schools. Many of them did set about to reorganize their courses and make such other provisions as were essential to meet the requirements for federal and state aid. In many other places, however, the former type of work continued under the cloak of another name. The aim could not be fulfilled, because the teacher lacked training. The limitations of the shop and equipment prohibited it, and the trade conditions of the locality did not warrant it.

EFFORTS TO STANDARDIZE SCHOOL SHOPWORK

As a result of the widespread interest in industrial education and the publicity given to that type of work, manual arts teachers began to look into the merits of their subject. Since the manual arts were under the fire of criticism an editorial in the *Manual Training Magazine* gave warning to "manual training teachers to be prepared for this scrutiny, to cooperate and combine in standardizing their subjects and in deciding what to retain and what to reject in the process of putting their house in order." [117 : 384]

That teachers and leaders in the field were making an attempt to combat the criticisms of the proponents of industrial education by attempting to reorganize the work along lines that would meet the demands of the public and critics is evident in the number of states cited that had set about standardizing their courses in manual arts. [117 : 384–388] Laughlin writes about the effort to standardize the seventh and eighth grade shopwork in Peoria, Illinois, so that the boy would be able to know and do certain things by the time he had reached the high school. [85 : 339–351] Two years later, Berg published an article on the standardization of eighth grade shopwork. [50 : 443–446] This movement to standardize shopwork courses is still evident in the study of the committee on Standards of the American Vocational Association. [60 : 344–345]

VALUE OF THE INDUSTRIAL EDUCATION MOVEMENT

In the opinion of Mays, the Industrial Education movement exerted a healthy influence on the manual and industrial arts. Many of the members of the Society for the Promotion of Industrial Education saw fit to attempt to discredit industrial arts with the American public. While some of these strong attacks served to discourage some young teachers and caused a number of school administrators to consider dropping the subject from their schools, it brought forth strong advocates for industrial arts who set about to re-examine the subject and to re-state its values and aims in more attainable terms. Thus the self-analysis which took place proved to be a boon to the field of industrial arts, and the vocational education movement, which at one time threatened to eliminate it from the curriculum, turned out to be a benefactor. [19 : 204; 90 : 89]

SUMMARY

The cultural trend in manual training was severely criticized early in the twentieth century by persons both within and without the educational field. Many thought the shopwork should contribute more directly to the vocational preparation of the pupils taking the work. As an outgrowth of the Report of the Massachusetts Commission on Industrial and Technical Education and the activities of the National Society for the Promotion of Industrial Education,

there is evident a movement to organize the school shops on the plan of the factory system. The individual craftsman method and the individual problem gave way in many places to the group or class problem produced on the factory plan whereby each pupil performed only a few of the operations involved in making the article. Furthermore, there is noticed an attempt to standardize the work in the several grades in order to combat the critics and definitely to show those essential trade elements that the pupil had learned during the course of his work. Immediately following the passage of the Smith-Hughes Bill there was a distinct attempt made by many teachers to claim they were offering vocational training, although slight, if any, effort was made to reorganize their courses of study to meet this aim. Furthermore, if these courses had been reorganized, they could not have fulfilled the aim because of the limitations of equipment in their shops.

CHAPTER X

THE DEVELOPMENT OF "INDUSTRIAL ARTS"

THE reader must keep in mind that there was considerable overlapping in these various movements. The transitions did not take place qui Although certain ideals were advanced by leaders here and there, they were not readily accepted or adopted in the field. Respect for certain practices had been inbred in special teachers and they were slow to change. [151 : 147]

CRITICISM OF TRADITIONAL PRACTICES WITH SUGGESTED CHANGES

Haney was among the first dissenters from accepted practice to be found criticizing the efforts of some teachers to force the pupil to square with the "logical sequence," where the exercise received first consideration and its appropriateness last. Many courses continued to be so organized in orderly, regimented fashion that the pupil never had an opportunity to plan or do anything by himself. In speaking of such a procedure, Haney says,

> Skill is cultivated and discipline maintained, but there is lacking the incentive to that freedom in thought, to that self-reliance in action and individuality in expression which is necessary to the child who is to be trained to be an active, forceful man. [151 : 147]

He would not only have the child know what to do but why he does it, and suggests it would be better practice after the instruction to let the pupil experiment, even at the cost of some extra material, than to force him through a dictated course. [151 : 156] As a further step in making the pupil aware of the why of things, he proposed that, wherever possible, the child tear down a completed model and thus determine the steps that would be necessary to duplicate it. [151 : 156] The following year an article in the *Sloyd*

Bulletin stated it was desirable for pupils to be allowed to work out their own ideas and inventions but stipulated that, if they are permitted to do this, they should first have had some experience with tools and some conception of construction, form, and suitability. [137 : 14–17]

Three years later, Bennett criticized manual training teachers for doing all the thinking for the pupil and for presenting the problem solved, leaving the pupil only the manual work. He suggests it would be well to have the pupil make his own analysis of the problem, list the steps necessary in working it out, and submit them to the instructor for criticism and approval instead of the common practice whereby the teacher dictated the steps. [47 : 125] In the same year, Payne also took issue with the practice of telling and doing, which he implied was rather common in manual training shops. In his opinion, manual training could be made properly educative by bringing about a closer relationship between theory and practice; by developing the respect of the pupil for the thinking side of the work as well as the doing side; by showing its value in interpreting everyday life; by settling upon large principles and leaving details to be worked out by pupils; and by developing causal relations, thereby giving the child an opportunity to do his own thinking and form his own judgments. He was working toward a shift of emphasis from the product to the child. [98 : 375–376; 97 : 425–428]

Although Griffith was satisfied that the movement for the "exaltation" of the individual, with its resulting emphasis on "self-expression," "originality," and "inventiveness," was a needed influence and came none too soon, he felt that this movement had gone to an extreme which put too much stress on the thought side of the manual arts. [72 : 148] To him, both the thought and the skill sides of manual arts were equally important [72 : 149] and should go hand in hand rather than one side being allowed to suffer because of undue emphasis upon the other. In 1908, he saw evolving out of the Russian, the sloyd, and the "psychological movement," a new practice in manual arts which would be marked by the best of the three. [72 : 150] We have here an influence toward transition from the "manual arts" to the "industrial arts."

THE ARTS AS CONTENT SUBJECTS

These criticisms led to an emphasis being placed on the social meaning of education. The result was that more and more attention was turned to the subject matter or content aspect of the manual arts, as the subject was increasingly being called. [176 : 678] All forms of the work were to be made the core of instruction for other subjects.

Bennett gives much credit to Professor Dewey and his book, *The School and Society,* for the position manual arts began to attain in education. "In this book . . . ," wrote Bennett, "Professor Dewey accorded to the manual arts a significance in education which they had not enjoyed before." [46 : 362] He further stated that most of the progress made in manual arts during the first quarter of the twentieth century was largely in the direction pointed out in this book. He believed that workers in the field of manual arts education had been attempting to realize in public school practice the ideals set forth by Professor Dewey, although in most cases they had not been aware of their aim. [46 : 362]

With the increasing emphasis upon the content of manual arts rather than upon the acquisition of technical skill, the conception of the subject came to be more that of an educational instrument which would function to illustrate the achievements of the race and to acquaint the pupil with the fields of art and industry. [156 : 784; 176 : 678] This was more true of the elementary schools than of the high schools, which continued to hold a status which fluctuated between cultural and vocational aims. [176 : 678]

PLAN OF INDUSTRIAL ARTS

According to Warner, "The shift to industrial arts and its emphasis upon the social and economic values of practical, exploratory, and creative activities" can be "traced to the criticism of Frank McMurry, Dean James E. Russell and others." [40 : 9] Without doubt, if teachers of shopwork had taken cognizance of criteria for the rejection of subject matter set up by McMurry [167 : 197], manual arts would have undergone a reformation at an earlier date.

Richards, somewhat more farsighted than others, in speaking of

the advances made in manual arts, pointed out that most of the progress had been made upon the side of method. [101 : 2] At the same time he referred to the important part the "industrial arts" had played in the development of the race and raised the question,

> Is it not at once our opportunity and responsibility to identify ourselves as representatives in the school of this great field of human activity and take for our task as teachers the interpretation of the arts and industries of modern life? [101 : 4]

By this means he hoped to bring the "manual arts" into a closer relationship with the other school subjects for a better understanding of real life. To attain these ends, the teacher would need to be more than an instructor of crafts and would need to work through a liberal use of discussion, drawing, and illustrative materials as well as constructive projects. [101 : 6]

Dean Russell pronounced a most serious indictment against "manual training" when he said,

> Subtract from our present manual training course that which is essentially applied design and those exercises which are intended to afford motor expression in the learning of other subjects in the curriculum, and what is left is an incoherent, unorganized series of projects without purposes or educational values. [108 : 440]

Although he criticized the practice of manual training in the period, he believed the subject possessed merit and was in the curriculum to stay because of the pedagogical need and the public demand. [108 : 436] However, it was his conviction that motor expression and art training could "as well be secured as by-products in doing something worth while as by making them ends in themselves." [108 : 440] Thus he proposed a course to be known as "industrial arts," whereby the elements of the industrial processes in transforming the raw materials of foods, textiles, woods, metals, and clays into usable products would form the basis of the work. Within the scope of such a study all the stages of production, manufacture, distribution, and consumption might well be considered. [108 : 442–443] Not only would this systematic course in the study of industries provide for self-expression in art and motor activities but it would also simplify the teaching of other subjects in the curriculum.

[108 : 450] In the opinion of Dean Russell, a study of the industries was necessary to round out the education of the pupil and to prepare him for the vocational training which was to follow. [108 : 450]

The following year, Professor Bonser, in an address before the faculty of Teachers College, cited the "tendency to bring the work of the school into more vital relationship with the immediate world of activities and interests in which the child lives" [127 : 1–2] and said,

> . . . the movement to organize, enrich and more scrupulously to evaluate on the basis of educational worths the field of subject matter in the industrial arts is the movement characterizing the school as an institution today. [127 : 4]

Although manual training and manual arts along with other subjects which he named had helped to bring a closer relationship between school and life, nevertheless he considered the results disappointing both from the standpoint of vocations and of pedagogy. Nor had these subjects developed a degree of skill and efficiency to meet vocational requirements or a thought content sufficiently rich to justify them as school studies. [127 : 4] However, he did believe that industrial arts rightly interpreted possessed sufficient content to warrant a place in the curriculum on the same basis as other studies, and, if properly organized, that it would be a "revitalizing and motivating influence" on much of this other subject matter. [127 : 6]

The plan of Professor Bonser was very similar to the plan of Dean Russell. He likewise proposed to select definite units typical of important industries and organize them into a course of industrial arts, whereby production, transportation, and distribution of basic materials with their resulting social and economic significance would be studied and an opportunity provided the pupil for the manipulation of these materials. [127 : 7]

The point of view presented by these two educational leaders did much to revolutionize the industrial arts from the narrower manual training idea and make it a valuable content subject in the elementary and secondary curricula.

METHOD

Some of the arts teachers were not ready to have their carefully ordered courses of analyzed processes cast aside through the pupil selection of problems. Sensing the increased interest of the pupil in cases where he had a choice in the design of the model, they compromised by using the blank model and letting the pupil modify it with his own outline design and surface decoration. [116 : 212–213; 189 : 48]

The three methods considered by Burnham in 1906–1907 as being the most valuable in teaching school shop courses were: dictation, assigning a definite problem upon which limitations were placed, and the project-problem. Dictation he considered indispensable although he felt it characterized too much of the teaching. In the second method, the pupil was permitted to work out the assigned article according to his own plan but was restricted in the amount of the material he might use. Under the third method an opportunity was given the pupil to attempt to solve a problem arising out of some school or home need. From this method Burnham saw a chance for developing a closer relationship between pupil and teacher in careful planning as well as in correlation with other subjects. [225 : 263] The following year he stated that the two methods of dictation and an analysis of the problem by the pupil himself, following a short talk by the teacher, appeared to prevail almost exclusively in teaching the "manual arts." The former method, he felt, failed to inspire the pupil with confidence. In this method, he favored giving a wider opportunity for self-activity on the part of the pupil through the use of a greater variety of illustrative material and the frequent use of legitimate mechanical equipment. [226 : 288] In solving the problems presented in a course in industrial arts, Bonser would have the pupil use such means as constructions in laboratories and shops, excursions, investigations, and questions of people and books. [127 : 11]

LATER TENDENCIES

Since the development of the industrial arts no distinct change has been noticeable in any direction, although significant trends are

evident. The development of the junior high school has affected the organization of work in grades seven to nine. The industrial arts work has come to be recognized as a part of the general educational program, and an effort has been made to meet the exploratory and general developmental objectives. [204 : 4]

Shop Organization

Parallel with the development of the junior high school there is to be noted, as a result of the effort to give training that would fit pupils better to meet real life experiences, a change not only in the content of the courses in industrial arts, but in the organization of the shop for purposes of instruction. The first new type of shop organization was the home mechanics shop wherein the pupil was taught those fundamental processes underlying repair and maintenance jobs in the home. Closely following this organization was the general shop plan, whereby several activities dealing with a variety of materials and processes are brought together in a single shop. [205 : 13]

Individual Instruction

Another tendency which is in keeping with the newer philosophy of education has been the shifting of the emphasis from class instruction supplemented by individual instruction to individual instruction supplemented by class instruction. Attempts were made at first to solve the problems of class instruction by means of individual oral instruction, but the method imposed considerably more work upon an already busy teacher. Since the period of the World War many forms of written instruction sheets have appeared in an effort to improve the efficiency of instruction. [69 : 41]

Contrasting Philosophies of Industrial Arts

Two contrasting philosophies of industrial arts education are evident at the present time. One finds its expression through the American Vocational Association Committee on Standards, and would set up specific skills and information the pupil should acquire as he works in several school shops. [60 : 344–345; 59 : 189–191] The other finds its expression in what Leasure chooses to call the

"Open Shop" [86 : 29–30] wherein the activities appear to center around the one general objective of personal growth of the pupil. In the latter all problems are pupil selected according to individual interest and needs, and are limited only by the ability of the pupil and the limitation of the equipment. Specific skills and knowledges are not taught except as they further and find application in the problem. According to this theory it is more important that a pupil have an opportunity to think through a problem and express himself according to his interpretation than it is for him to be rotated through a sequence of adult selected tools and processes.

Academic Trend

Another significant trend is the movement to organize the instruction periods as well as the content of the industrial arts work on the same basis as other school subjects. While the move to shorten the shop period has been primarily to simplify program making, it has accompanied an adjustment of shopwork so that the pupil may earn the same amount of credit for college entrance that he does in other subjects. Two states have taken significant steps in this development. New York has prepared courses having a decided academic slant. Five hours each week are spent in the shop classes and an equal amount of time is necessary for outside preparation. A plan has been worked out in Illinois whereby industrial arts courses receive the same credit as academic subjects having the same number and length of recitation periods. [45 : 8–9]

SUMMARY

Significant in this movement has been the tendency to shift the emphasis from the acquirement of tool skills and the knowledge of processes to the content of the subject. The idea has developed that the trades are so numerous that it is impossible within the province of the school shop to teach all of their processes. The school is largely limited to hand skills because of economic factors, and the age and ability of pupils. Through the introduction of machinery and specialization in industry, trades are constantly changing, and these hand skills are now little in demand. Therefore the school shop is becoming more of a laboratory in which the

pupil may get first-hand information about materials and in which he can explore those fields that appeal to his interests.

In this movement is to be noted the tendency from teacher dictated problems fully explained toward pupil selected problems demanding some thought and self-direction on the part of the pupil. In keeping with the tendency toward enriched content in industrial arts work is the movement to shorten the class period and place the work on an equivalent credit basis with the other school subjects.

CHAPTER XI

TEACHING METHODS AND DEVICES

Class Method and Individual Method

A PROBLEM that presented itself at almost the very beginning of handwork in the schools was the question of whether instruction should be presented by the class method or by the individual method. The Russian system made use of the class as a unit, whereas the sloyd ideal was to give instruction individually. From these two practices evolved the practice of using both methods so that instruction was first given to the group by the class method and then supplemented by individual instruction as the need arose. [10 : 104–105]

Although the Russian system stressed the class method of teaching as an economical feature [238 : 32] it was evident to the advocates of the system that a certain amount of individual help would be necessary. Sloyd leaders, on the other hand, early admitted that in order to economize the teacher's time compromise was necessary, and stated that class instruction could be used in teaching the names and uses of tools, working positions, and drawing. [187 : 32; 162 : 600–601] Trybom, however, believed the class method of instruction, on the whole, placed all pupils upon an assumed level. The brighter pupils would be able to derive some benefit from such instruction, whereas the less capable pupils who were most in need of help would receive little or no benefit. He considered individual instruction best because it could be suited to the capacity of the child and could best develop its mental activity and thereby make the most of the educational value of manual training. [188 : 459]

Bennett recognized individual instruction as necessary because of the character of the work and the special needs of pupils. Nevertheless, he felt that the pupil acquired a training through class instruction that was not possible with the teacher's help alone. In addition

to the pupil value of class instruction he advocated it "because it greatly simplifies the problem of introducing manual training into the schools." [141 : 450] Bennett is evidently referring to an economic factor in teaching which Selvidge criticized as being a factor in prolonging methods of mass instruction in the schools. On this point he said, ". . . there is a tendency to overlook the fact that economy does not consist in spending fewer dollars but in getting more for each dollar expended." [111 : 1] Harris, who at one time had been a most active opponent of handwork in the public schools, considered the class method of instruction the best means of presenting the theory of shopwork. In his opinion, one-quarter of the shop period was sufficient time to devote to this procedure, after which the pupils should work out the principles at his bench. [211 : lii]

Where certain things had to be told to all pupils, Johnson considered class instruction advisable from the standpoint of conserving the time and energy of the teacher. The teacher should determine when the class as a whole was ready for such instruction. He apparently recognized the limitations of class instruction for he stated, "Individual instruction should always supplement the group and class teaching." [79 : 166] Laughlin made use of the class method, but he placed the responsibility for the preparation of the material to be discussed upon the pupils [84 : 8], thus making them active participants rather than passive recipients.

One of the disturbing problems of class instruction has been the matter of determining the best time to present such instruction so that the greatest value would be realized. Some would take a few minutes at the beginning of each period. Others would wait until such time as it was evident all members of the class were aware of the need of instruction, while others, like Berry, would call the class together whenever a new problem arose in the work of any boy. [51 : 158] Where it was a real problem of a member of the class and inasmuch as the solution had immediate application, he argued that the pupils would give closer attention and show keener interest at this time than at any other. Berry was evidently not taking into account the matter of individual differences and the period of time elapsing between the period of instruction and its application with the corresponding diminishing retention of the information.

The question of how much time shall be devoted to class instruction has been another problem raising much discussion. Harris gave one-quarter of the period as the maximum amount of time. Eaton considered twenty-one minutes of a ninety-minute period sufficient. He would further break this up into periods of five minutes each for lecture and demonstration, ten minutes for a quiz, and one minute for distributing instruction sheets. [65 : 8] Newkirk and Stoddard say that not more than one-fifth of the pupil's time should be taken up in class instruction. [21 : 45]

Bennett early implied certain values for the pupil inherent in the class method of instruction. [141 : 450] Berry also felt that the discussions and explanations of the class instruction possessed particular benefits for the pupil. [51 : 158] Selvidge recognized certain valuable outcomes from group discussions in special types of work. Among the benefits to be derived were the clarifying of ideas, the developing of new points of view, the appreciation of opinions of other pupils, and the aid to expression and its socializing effect. [111 : 3] Struck likewise cited the opportunities for social-civic participations that are provided by group discussions. [31 : 60]

Teachers of shopwork were early aware of the difficulties of class instruction [138 : 293], and various devices were resorted to unduly in an attempt to keep pupils in a class together. [3 : 69–74] Nevertheless, for economic and traditional reasons the class method of instruction supplemented by individual instruction continued to dominate shopwork for some time. [138 : 293] Trybom had called attention to one of the difficulties of class instruction in the differences in pupil capacity. [188 : 459] Selvidge discussed the same difficulty somewhat further and brought out the amount of time lost to the brighter pupils while the teacher was trying to impress some idea upon pupils whose intellects were not so keen. The tendency of some teachers to talk too much in class discussions causes a loss of time. [26 : 91] What may be economy of time from the teacher's standpoint may not be economy of time for a number of pupils who fret because they are kept from their work. Selvidge points out another difficulty of group instruction where the slow pupil is not ready for the instruction, sees no immediate need for

it, does not follow it with interest, and is able to retain only a small amount of the instruction. [26 : 91] On the other hand withholding instruction from the bright pupil or assigning him supplementary work may set up undesirable habits and attitudes. [28 : 274]

Group Method of Instruction

One of the first efforts to combine the economy and stimulus of class instruction with the advantages to be obtained from a consideration of individual needs was the group method of course arrangement. According to Bennett, this method of arranging the course was first demonstrated by Teachers College at the Columbian Exposition in Chicago in 1893. [3 : 74] The group method of arranging the course of instruction was an outgrowth of the difficulty teachers had experienced in attempting to keep their classes together, and was based on an analysis of the leading industrial fields. Under this method, the course of instruction was made up of a series of blocks arranged in sequential order. Each block contained one or more fundamental elements selected from the teaching units arrived at as a result of the analysis. In the effort to meet individual needs several models were suggested for pupil choice because of interest, ability, or needs instead of the assignment of one model to illustrate the fundamental principle involved. According to this theory the class would all be together at the beginning of each new block and therefore the essential information could be given to the class as a whole, leaving the teacher more time to give such additional aid or information to groups or individuals as necessity dictated.

Griffith was instrumental in calling attention to the group method of organization of subjects. In an article in 1908, he called attention to the Illinois State and the Oak Park courses of study, both of which were organized on the group plan. [72 : 148–160] He may also have directed greater attention to the group method of arrangement through the publication of his book, *Correlated Courses in Woodwork and Mechanical Drawing.*

A survey of courses of study in industrial and manual arts will indicate the extent of the influence of this method of course organization. The arrangement persists today and is perhaps most no-

ticeable in some of the recent textbooks on mechanical drawing. It is also reflected in the differentiated lesson assignments in mechanical drawing practice.

General Shop Method

In a general shop organized on the idea of assigning groups of pupils to definite station points and then rotating the groups through the different activity experiences, each group has been treated as a class and instruction has been repeated for each group as the need arose at each station. In general, formal class instruction has not been practiced because the opportunity to apply the information would often be so remote that the instruction would have to be repeated. Others have attempted to solve the problem through individual oral instruction and through written instruction sheets. In some cases the general shop plan has been used by rotating groups for a specified period of weeks in each of several unit shops.

Free Activity

In the Boston Whittling School, the pupil was free to select and make such little articles as suited his interest. [238 : 28] Reference has also been made to Omaha, Nebraska, where freedom of selection was given to pupils. [198 : 430] This freedom of activity must have been more widespread than the various reports would indicate, for Woodward took pains in 1903 to condemn the practice severely. [214 : 1041] Laughlin tells of the two extreme types of teachers in the Peoria schools. One group were strict disciplinarians while the other group looked upon the school shop as a boys' club where a boy could learn something for himself without dictation by book or teacher. [85 : 339–351] Leasure describes the "open shop" he operated in the Fieldston School upon a plan similar to that used by Professor Strickler in the Lincoln School of Teachers College. Contact with his students and other teachers indicates that many are attempting to operate their shops along similar lines. Some of them are not too well grounded in what they are doing but are dissatisfied with traditional ways of teaching shopwork and are alive to possibilities for improvement.

In defining the "open shop" Leasure wrote, "I mean by an 'open

shop' all that the term implies within the possibilities of a well equipped shop where pupils may work in classes, as individuals, and in groups or clubs; a shop where any craft, hobby, or project may be carried on by adolescent boys and girls." [86 : 29]

Many teachers of the manual training school type fail to see value in any other method of teaching shopwork than a well ordered presentation of tools, processes, and problems. An editorial in the *Manual Training Magazine* takes issue with those who would give the child an opportunity to experiment and find out some things for himself. [78 : 49] Vaughn also condemns what he calls a "methodless method that undertakes to satisfy the temporary whim of individual pupils at all times." [121 : 394] It is his opinion that such work is too haphazard to be arranged to meet any real standard. While recognizing interest as a valuable motivating force, he contends the school must guide the pupils' interest rather than follow it. He considers certain interests more important than mere temporary fancy or caprice on the part of the child.

Fryklund also criticizes what he terms the trial and error method of education in the industrial arts and claims it is the greatest evil hindering the progress of manual training. He sees it as a method wasteful of time, material, and results. He does not consider it advisable to let the boy experiment in ways of doing things until in the later high school years where he has obtained a background of experience. This experience must be provided through the facts of "race experience" taught to the pupil beginning with the upper grammar grades. [70 : 185–186] Because of the pupil's lack of experience, Fryklund believes he should not be expected to select the things he should be taught. Society working through the school and the teacher should dictate what shall be learned. [69 : 43] Laubach also believes the pupil should receive fundamental instruction in tool techniques and conventional orders of procedure either before or during the execution of the project to prevent his wasting time. [135 : 172] Friese likewise condemns a free-choice method and says, "It is well to note that there have been no records of exceptional, moderate or lasting successes with this method." [8 : 70–71]

There are those who see value in the more or less free activities

of the shop. Early in 1900, O'Shea made the statement that manual training must follow the lead of the child's interests if it would accomplish its specific purpose of experimentation in motor experiences. [95 : 59–60]

Judd brings out the point that the pupil can learn much through his failures because they are more vital and lasting than mere words. "Impressions made by failures," he says, "produce deeper thought, inspire new resolutions, and energize will power, . . . by his failures he gains a mastery over himself and thus unconsciously lays a foundation of sound judgment. . . ." [80 : 423] Furthermore, he called attention to the fact that much of our early and later acquired knowledge is self-gained without the help of direct teaching. [80 : 423]

Edgerton, as a result of his observation, came to the conclusion that boys who were allowed considerable freedom in selecting useful jobs showed greater interest and did better work in less time than those who were arbitrarily assigned work of a similar nature. [66 : 251–252]

MacDonald said there was too much tendency to stress factual subject matter rather than thought subject matter because it was more easily organized. Thought subject matter, he maintained, would provide pupils with tools to meet new situations successfully without direct assistance. [91 : 45] That there was too much of the formal dictated type of manual training with emphasis on technique and the production of the beautiful model was the conviction of Stark. He would favor some method which possessed more educational value, one which gave consideration to pupil interests and which provided the child with opportunity for experimentation with matters he met in his everyday life. [118 : 414–420] Grinstead, also, believed pupils should be given an opportunity to exercise self-reliance, initiative, originality, and inventiveness. [73 : 292]

According to Leasure, the "open shop" lends itself to a freedom of expression and a socializing influence not possible in the traditional shop. Furthermore, it provides opportunities for bringing out the potential capacities of the individual and gives a wider acquaintance of activities through an observation of the contribu-

tions of other members of the group than is possible under the limited program of the traditional shop. [86 : 29]

Assignment

An examination of the literature of industrial arts brings forth a large number of teaching methods and devices that have been utilized by teachers of the subject in organizing and presenting their work. Under the heading of assignments may be found the contract, the differentiated assignment, free choice, group choice, guided choice, no choice, and partial choice. The no choice method characterized much of the early manual training work. With the development of the doctrine of interest, free choice, group choice, and partial choice methods appeared. With a better understanding of individual differences, guided choice, the contract, and differentiated lesson assignments were introduced. All these forms of assignments are found in industrial arts work today.

Demonstration

Instruction has been presented through such means as the demonstration, dictation, discovery, discussion, explanation, illustration, imitation, instruction sheets, lecture, observation, and recitation. The older of these devices are demonstration, dictation, and the lecture.

No one method for the presentation of instruction in industrial arts has been emphasized so emphatically or so consistently as the demonstration. Ericson says,

> From the earliest time that instruction in manual arts was introduced as a school subject the demonstration has stood out as the most definite and valuable means of instruction. It continues to be so at the present day wherever it is desirable to have students learn exact and acceptable methods of performance in mechanical operations. [7 : 56–57]

This method so dominated the Russian system of manual training that a reader of the early reports may ofttimes question if any other method of presenting industrial information was practiced.

The statement in the Washington University catalogue for 1881–1882 [337 : 60] appears to have set the pattern of instruction in subsequent schools for nearly a decade. Some justification can be

found for the emphasis given the demonstration in this early period when it is recalled that few books on handwork suitable for the use of children of school age were available, and it was this fact that early lead the Boston Industrial School Association to develop a textbook. This being the case, instruction in handwork was largely dependent upon oral instruction and manipulative imitation. No detail appears to have been overlooked. Although the method was economical and efficient from the teacher's point of view, it would seem to subtract much that possessed educational value for the pupil.

According to Vaughn and Mays, "The necessity for the demonstration arises out of the inefficacy of words and of the disposition to avoid the wasteful trial, error, and discovery method of arriving at proper usage or procedure." [33 : 91]

Though Tadd believed in freedom of expression by the pupil, nevertheless he dogmatically stated that "every tool should be explained thoroughly and made manifest in as many directions as possible." [32 : 325] Apparently he was not of the same opinion as some other proponents of freedom of expression criticized by an editorial of the *Manual Training Magazine* which implied that too much emphasis was being put on letting the boy find things out for himself with the consequence that too many false impressions resulted. [78 : 48–49]

Beginning near the end of the second decade of the century and continuing during the next ten years, the demonstration appears to have gone through a period of refinement with more attention being given to class presentation. Berry would have the teacher give the pupil a clear, analytical explanation of how and why to use a tool in a certain way as well as the principles underlying the situation for each new factor. [51 : 158] MacDonald was so confident of the value inherent in the demonstration method that he said it would always remain the most satisfactory if not the most popular method of teaching. [92 : 293] Furthermore, he said it is no doubt the widest used and the easiest of all methods. Friese called it the "natural method" and brings out the point that pupils learn much better by seeing a thing done than by hearing about it. [8 : 72] Haynes likewise claims the demonstration as the most

natural method of teaching the pupil any act or skill. [11 : 68] Ericson stresses the demonstration because it is based upon imitation as a factor in learning and "imitation is a natural instinct which figures greatly in all types of education." [7 : 57] Struck considers the demonstration as the best means of having pupils start forming right habits in the manipulation of tools, materials, and machines. [31 : 44]

Fryklund recognizes three forms of the demonstration: (1) the teacher does all of the work; (2) the demonstration by the teacher is oriented by an instruction sheet; and (3) pupils participate in the demonstration. [69 : 44] Taylor considered the motion picture as an improved form of demonstration. [120 : 57] Schoenike and Van Duzee are of the belief that good illustrative material makes the demonstration more interesting and effective. [109 : 205]

Ericson lists several advantages of the class demonstration, such as economizing teacher time, all of the class receiving the same information, and the developing and maintaining of interest among pupils. [7 : 57–58] Griffith gave economy of time as the chief advantage of this method. [9 : 154] Friese emphasizes the same thing in pointing out that showing pupils how something is done is the quickest way of getting them to do it. [8 : 72] Newkirk and Stoddard are of the opinion that a short demonstration of each project is advisable even though the teacher has an excellent organization for shopwork. [21 : 45]

The method does not appear to have been seriously questioned until a few years after sloyd had been introduced into this country. One of the principles of sloyd was that the pupil should be trained to think through his problems. In 1902, Trybom made the criticism that the teacher in attempting to make everything clear was likely to give so much information that little independent thought on the part of the pupil was aroused. [188 : 459] Griffith cited as a weakness of this type of instruction that it tended to develop not resourcefulness but a dependence upon others. [10 : 155] Swope was of a similar conviction and expressed the opinion that many pupils were failing to think because of the zeal of some teachers for demonstrations. [119 : 181] Although Friese considered the method economical of time, he believed it neither developed initia-

tive or reasoning nor could it be used as a means of developing art appreciation. [8 : 71–72] It was the conviction of Selvidge that, although mass instruction might be expedient at times, effective teaching demands that learning should be recognized as an individual process. [138 : 293] Selvidge and Fryklund likewise criticized the group demonstration because it was based upon the assumption that all pupils need to know the same thing at the same time and it failed to take into consideration the problems of individual differences. [28 : 168]

From the foregoing it is obvious that critics and advocates alike have the feeling that the demonstration has a place in the teaching of industrial arts. Both sides appear to agree that it is an efficient method of teaching such basic skills and general knowledge as are common to all at the beginning of the semester or at such other times through the term when there arises a common need. That it is a quick way in which the pupil may acquire a manipulative background or fund of experience upon which to approach his industrial arts problems, they are all agreed. In this early period, according to Griffith, a large amount of discovery takes place "in the execution of the most carefully demonstrated exercise." [10 : 155] Apparently what is needed is a compromise between those enthusiasts who would demonstrate each detail and those who would leave all to pupil discovery. Obviously, to a certain point, the demonstration possesses educational value, but beyond that point other methods must be used if teachers are to develop initiative and provide for individual progress.

Lecture

Although the lecture has been much criticized as a method of teaching secondary school pupils, there may be a place for short practical talks in the school shop. Often facts related to the work are as important as the processes performed. [7 : 64] The lecture provides a quick means of presenting this information to pupils. It may be desirable for pupils to obtain much information through their own efforts, but there are times when such information is not available in printed form or when it is it may be so technical that it needs to be interpreted for secondary school pupils. [31 : 45]

Haynes lists three objections to the lecture method: (1) too often the pupil addressed is merely a recipient and gains his information too easily to appreciate it; (2) the teacher has no means of testing his hearers for their mastery of the material presented and their ability to apply it; and (3) the method is lacking in interest. [12 : 62]

The last two objections appear to be hardly valid. They may be faults of the lecture which could be overcome in a degree if the purpose, aim, and outcome of the lecture is made clear to pupils and if it is followed by active participation on their part. Struck estimates five per cent of the time usually devoted to shop instruction as sufficient for the lecture. The time, he says, "will vary with the maturity of the pupils, their previous training, and the objectives and content of the course." [31 : 45]

Discovery Method

The discovery method is a method which was advocated in the early nineties, and consisted of an analysis of a complete article to determine the steps which should be taken in its construction. The article was either mentally or actually taken apart and reconstructed. This method had a value as thought emphasis but cannot be said to meet the needs of the present-day conception of industrial arts. [33 : 110–111]

Discussion and Recitation

Discussion found a place in early manual training schools as a means of determining pupil understanding and has remained one of the methods of industrial arts teaching. The recitation has not attained the place in industrial arts that it has in some laboratory subjects. Bowman considered the recitation a necessary part of manual training. [54 : 378] McEven mentions calling the class together for at least the first fifteen minutes of each period for class discussion, instruction, demonstration, or recitation. [93 : 306] Haynes also believed there was an advantage to be derived from assembling the pupils at stated periods so that certain information could be presented in an orderly and systematic manner. [12 : 58] Smith suggests it would be well if pupils assembled at the beginning

of the hour to learn something new instead of immediately going to work. In a plea for the use of a variety of methods, he indicates that even the old-fashioned question and answer has a place. [114 : 350]

Dramatization

Dramatization has been little used as a method in industrial arts in the secondary schools, except in so far as it has been utilized in presenting assembly programs. The method is more widely used in the elementary industrial arts. Payne is of the opinion that more use should be made of the method in the secondary school. [22 : 136]

Imitation

The imitation method is closely related to the demonstration and dictation methods. The pupil is shown or told how to do something and then is expected to repeat the process as demonstrated. The method does not develop resourcefulness but is one of the quickest means of developing skills. It is a natural method of learning and may be used where it is essential to develop quickly a background of manipulative powers. After this background has been provided, other methods should be used to develop initiative. [8 : 71–72; 31 : 30–31; 10 : 154–156]

Explanation

Explanation may be thought of as a more elementary form of demonstration to be used mainly in clarifying a few minor points which may be hindering the pupil's progress. More teaching and learning probably go on in the shop as a result of pupil observation than is commonly supposed. It is an imitative form of learning by means of which pupils gain ideas by seeing teachers and other pupils do things. This opportunity for pupils to gain vicarious experiences through the activities of others is probably one of the strongest points of the general shop.

Illustration

The illustration is related to the demonstration as a teaching device. The essential difference is that the demonstration makes

use of real tools and materials and the illustration employs substitutes. [12 : 69–70] In many cases the pupil can get a clearer conception of construction or the relation of working parts if cut-away models or sectional drawings are used. In other cases the information can be imparted effectively by means of large charts, as for example, in teaching a class to read precision instruments. Blackboard sketches, blueprints, charts, diagrams, drawings, and models have long been used in teaching industrial work. Kilbon, in 1894, advocated the use of large-sized models for teaching the difference between cross cut and rip saws. [158 : 34] An editorial in the *Manual Training Magazine* for October 1911, suggested that there would be educational value in the teacher's having some model of his own handicraft in the process of construction from time to time so that pupils could see it growing as a means of stimulating their achievement. [78 : 49] MacDonald suggested that the shop be equipped with a showcase in which all the important shop jobs could be displayed. [91 : 48] He also suggested the use of what he called an "evolution method" whereby an article would be presented by models or photographs in its various stages of development. [91 : 149] In 1894, Waite mentioned the use of lantern slides in teaching shopwork in Toledo. [190 : 21] In recent years there has been greater use of lantern slides, motion pictures, and photographs as teaching devices. Taylor declares the motion picture exceeds any other form of demonstration where continuous operations must be performed to illustrate a process. [120 : 57] Schoenike and Van Duzee state that lectures, discussions, and demonstrations may be made more attractive, interesting, and effective by use of instruction panels. [109 : 205] Newkirk and Stoddard see an increased use of the motion picture and slides as a teaching device in the general shop. [21 : 47] Haynes sees a danger in the use of illustrative material in the fact that it is easier to illustrate than to demonstrate. In his opinion, the illustration should not be used as a substitute for the demonstration. [12 : 70]

Experiment and Invention

Several forms of pupil participation in industrial arts work have already been mentioned. The experiment requires research on the

part of the pupil wherein he deals with control and variable factors. [12 : 70–73] In the invention method the teacher sets the problem and leaves it to the pupil to work out the solution. [22 : 135–136] Here it is essential for success that the problem be related to the experiences of the pupil and within his range of ability.

Correlation

Several leaders in manual activities have advocated correlations of one form or another since the early days of the subject. Numerous attempts at correlation have been made but without significant success. [206 : 25] Some of the earlier attempts were solely within the manual training department, and were characterized by the efforts to correlate the work of the shop and the drawing room. [36 : 20; 253 : Appendix p. 187] The required project for a graduation thesis of the Manual Training School of Washington University [339 : 14], which was to become a common practice in the manual training high schools for the next two decades, may be thought of as another attempt at correlation within the department.

In the early nineties the idea began to develop that manual training should not be an isolated special subject. Instead, consideration should be given to the mutual influences of this subject and the other studies of the school. [175 : 104] Bennett, in 1892, told how manual training, when properly taught, could integrate the other studies of the school. [141 : 451] At the same time, he pointed out, teachers of shop and other branches would need to have a more extensive and better understanding of the work being attempted in each other's field. [141 : 451] Several years later he was still of the opinion that the related direct experiences of the manual arts had a great deal to contribute in teaching the other subjects. [49 : 248]

Upton, in 1900, again stressed the importance of correlation between drawing and the other manual training work in much the same way as many of the early leaders and teachers in the field had done. He wrote, ". . . it is my opinion that correlation between drawing and manual training is a most vital necessity." [189 : 51] He believed that this enabled the child to appreciate the practical

value of drawing as well as to record the ideas that arose in connection with his original work.

Harvey was not altogether in sympathy with the effort to correlate manual training with the other branches of the school. He believed too many crimes had already been committed in the field of education under the name of correlation. He did not favor extending them further by correlating every form of motor training with some phase of the regular classroom. In his opinion correlation in educational work should be natural if it is to be effective. [152 : 129]

According to King, teachers were more interested in having boys do a given piece in the shortest possible time than in teaching them the instructional material related to the model. [81 : 91–92] It was his opinion that manual arts could be very useful in lending reality and fixing the abstract ideas of the classroom.

The best-known effort to correlate woodwork and mechanical drawing was recorded by Griffith in his book, *Correlated Courses in Woodwork and Mechanical Drawing*. He points out one difficulty which may arise in the close correlation of one shop course with another in the fact that sequence in one rarely corresponds with sequence in the other. [10 : 120] He also raises the question of generalized versus specialized training as one aspect of the problem, but leaves the impression that correlation should have a place in general education insofar as time and economic conditions permit. [10 : 118–122]

Ericson emphasizes the value of correlation both within the industrial arts department and with other departments. He says the value and interest of such work is often overlooked through lack of vision on the part of the teacher or through misunderstanding. [7 : 168–169]

Strickler, in speaking of correlation between the industrial arts and science, brought out the need for a broad background as a starting point because, "Intelligent correlation cannot be developed unless the applications of science in the industrial arts are known and understood and unless the applications of the industrial arts in science are understood." [39 : 98]

Until the qualifications of industrial arts teachers are raised and

enriched there is little likelihood that correlation will be more than superficial and sporadic.

Project Method

The project method has been utilized by some teachers to offset the effects of formal teaching. [83 : 326] Most of the emphasis on this form of teaching in the industrial arts field has come into practice since 1917. It has been used in teaching shopwork almost since the inception of the work in this country, although it has not been known under that name. The required project or thesis, already spoken of, fulfilled all the requirements of the four desirable steps of purposing, planning, executing, and judging which are given by Kilpatrick. [14 : 344–355] The project was initiated by the pupil, although it must be admitted that there was a certain amount of coercion in the requirement itself. The pupil planned, designed, and represented his ideas by means of a drawing. He did the actual work on the project through several shops. Judgment was based upon how well the project fulfilled the purpose for which it was planned. Most industrial arts projects that are not copied can easily involve all the thinking elements of the project method.

The project method of building and equipping the school shop at Clifton, Illinois, during the year 1911–1912, described by Stevenson [29 : 243–246] can most surely be matched a number of times during the introductory period of manual training.

Most of those who have written on the project method in industrial arts would agree with Whitney that it has the potential possibilities of developing wide interests in pupils, as well as providing a situation which requires pupils to be self-reliant and resourceful. [123 : 57–61] Since it employs a normal problem for which the pupil sees a need, it is the claim of the proponents of the method that the pupil will assume the responsibility for securing the necessary information and that he will take greater interest in developing the skills essential to a successful completion of his project. [83 : 328; 121 : 394] The teacher's place becomes that of a guide.

There appears to be some question among teachers as to how much of a background of knowledge in tool processes the pupil should have before he initiates a project. Prince would first teach

a minimum of tool processes by the imitation method. [8 : 269–271] Laubach believes it would be better for the pupil to have some previous experiences with tool processes but he would not rule out a trial and error method provided the teacher has time to give assistance whenever it is needed. [83 : 329] Strickler would let the pupils start the project and then teach themselves in so far as possible through experimentation in those processes they need to know when the need arises. It is his conviction pupils never learn to think their way through difficulties if each step is "solicitously" directed for them. [183]

The project method in industrial arts has certain limitations as it has in other subjects. Among these may be mentioned length of time required to complete the work, ability of the pupil, and the equipment required. [8 : 268] Another limitation cited by Struck is the difficulty of supervising a large number of projects. [31 : 55–56] This method would appear to call for an exceptionally well trained teacher with a broad background of experience and an unusual amount of tact. Tact would seem to be most essential in the first step of purposing, if the pupil is to select a worthwhile project within the range of his abilities. It would seem that in industrial arts work, in which useful articles are the vehicle of teaching, the project method varies from the usual practice only in the degree that the direction "Make this!" varies from the question "How would you like to make this?" In other words, much of the purposing is teacher purposing. Obviously the general shop with its more diversified activities will provide a somewhat better setting for the project than the unit shop.

Excursions

Excursions were used as early as 1884 by the Baltimore Manual Training School as a means for pupils to obtain practical supplementary information for their work. [244 : 144] An account of these excursions appears in the reports of the school for several succeeding years. Excursions were made by students of Washington University as early as 1871. Coates reports on trips of the Manual Training School to local and outside industrial plants. [199 : 43–44] Waite refers to the excursions of the Toledo Manual

Training School to local industrial plants. [190 : 21] Ruckmick and Ericson both state that shop teachers have long accepted and engaged in excursion trips as a means for pupils to obtain first-hand information with reference to industries. [107 : 248; 67 : 342] Both men suggest plans for conducting such trips so that the greatest amount of educational value may be received by the pupils. Ericson cites several difficulties that may arise in planning such a program, and lists (1) interference with the school program; (2) a transportation problem; (3) the responsibility for possible accidents; and (4) the problem of play spirit with its accompanying waste of time. [67 : 342]

Extra Assignment

During the first two decades of shopwork in this country extra work was given rapid workers as a means of "enrichment." This was the theory which in reality operated as a device to keep the class together as far as possible.

Related Information

Even the early manual training teachers realized that there was more to the work than just the learning of skills and processes, and they attempted to give oral information about tools and materials. Many of the earlier textbooks on shopwork had chapters devoted to information on materials. An examination of contemporary courses of study in industrial arts will reveal related information suggested for various units of work. Related information is of two types: that which is essential to a better doing of the work in hand and that which is concerned with the subject as a whole. [7 : 206] The question of how much related information to give and when it should be given appears to be a pertinent topic. Paustian suggests that those teachers who give too much related information come no nearer correct procedure than those who do not give any. [96 : 10]

Lesson Sheets

The development of the lesson sheet has been in keeping with the awakening sensitiveness to individual needs. Among the ele-

ments influencing its development are increased class sizes [106 : 34], the expansion of the general shop movement [21 : 48], and an increasing teacher load. [106 : 34]

The idea of individual instruction was first resorted to in an effort to solve the problems hindering oral group instruction. Some method was deemed necessary to care for the problems of individual differences, irregularity of pupil progress, inability of pupils to retain information, the necessity of repeating demonstrations; individual oral instruction appeared to be a solution. The method increased the difficulties of instruction by adding considerably to the work of the teacher, and as a consequence written instructions began to appear to take the place of oral instructions. [69 : 41]

In the early days of manual training the Boston Industrial School Association decided some type of aid in the form of prepared instructions for pupil reference was essential for the work to be successful. [221 : 220–224] The Manual Training School of Washington University also used some form of lesson sheet to aid the pupils' memory between the time of the demonstration and its application. [338 : 33] Bowman and Tustison cite a case where job sheets were used in the teaching of laboratory physics in 1910. [53 : 127]

In 1914, Crawshaw suggested a form of instruction sheet somewhat in the nature of a review sheet to be handed out to the pupils following a demonstration as an aid in their individual work. [61 : 155] Righter suggested in 1916 that the methods of science laboratory direction sheets might help to solve the problem of individual differences in the shop. [102 : 629] He did not believe such directions would take the place of the teacher, but they would relieve him of much of the detail in directing each individual pupil's work. Among the six advantages he cited at that time are several that are accepted today:

1. Each pupil can work on the project most suited to his own capacities and interests.
2. He can work forward as fast as his own abilities permit.
3. The sheets serve as directories of material and information.
4. Having written directions before him the pupil has no excuse that he did not remember instructions.

5. The instructor has more time to go about giving individual help.
6. Such sheets make possible a better correlation between the shop and the classroom. [102 : 629]

Correlation was to be accomplished by placing the sheets in the hands of teachers so that they might have knowledge of what the shop was attempting to do. His sample direction sheet contrasts rather sharply with the present-day instruction sheet. It at least shows an early awareness to the possibilities of instruction sheets. [102 : 630–631]

The job sheet was the first form of lesson sheet to develop. [8 : 75] This type of instruction sheet reached its greatest impetus during the World War when the United States government found it necessary to train men for technical military service in the shortest possible time. [105 : 119] Credit must be given also to certain science manuals and correspondence school lesson forms. These first sheets were based upon the job to be done as a unit and provided no instruction for performing the separate operations involved in doing the job. [37 : 28] Since that time job sheets have undergone a process of refinement so that many of them now give information on how to do the job with questions to direct attention to critical points. The manuals for use in rehabilitation work, published in 1919, and the technical army manuals, published in 1923, both show a degree of refinement over earlier forms.

No man in the industrial field, perhaps, has contributed so much to the development of instruction sheets as Professor Selvidge of the University of Missouri. The Selvidge plan of instruction sheets differs from the army plan in that definite information is given for performing the operations. In his plan, the operation to be performed is the teaching unit. Each unit is selected from an analysis of the trade to determine the things a man must know and be able to do in order to become proficient in the trade. [26 : 11–12] Both types of instruction sheets found their way into the industrial arts field shortly after the war and have continued to gain in popularity.

Selvidge recognizes four types of instruction sheets. They are operation sheets, information sheets, assignment sheets, and job sheets. [27 : 9]

Payne considered the job sheet "one of the best if not the best"

of the several kinds of lesson sheets. [22 : 120] This point of view is held by Newkirk and Stoddard, who believe the job sheet is well adapted to meet the needs of the general shop. [21 : 50] This point of view is not accepted by the majority of industrial arts teachers. One criticism is that unless a number of job sheets are made of several articles involving the same degree of constructive skill, the pupil has no choice in selecting his problem. [8 : 78] Friese believes that job sheets bar the use of the project method and lessen the opportunity of the pupil for initiative and resourcefulness in thinking and doing. [8 : 78–79] This obviously is the case, because the job sheet is supposed to tell how to do a complete job. [28 : 136] For educational purposes, it is suitable only for simple jobs involving a limited number of processes.

The other forms of instruction sheets are recognized as having a number of disadvantages as well as advantages. [28 : 127–133] Ericson is of the opinion that most of the difficulties encountered in the use of instruction sheets are not inherent in the sheets themselves but can be attributed to some shortcoming in the teacher. [7 : 70] Newkirk and Stoddard appear to be confusing instruction sheets and job sheets in some of the defects they list. [21 : 50–51] Most of the disadvantages cited are more apparent than real. There seems to be common agreement that it is difficult for many pupils to get information from the printed page. The same criticism may be made of textbooks. Where a pupil cannot get information from a printed page, which is constantly before him, it is certain he could do little or no better with oral instruction, where the information depends upon a single statement and he has no opportunity to refresh his memory in regard to details which may become a bit hazy between the time of their presentation and their application. Some of the criticism appears to grow out of the misuse of the instruction sheet. The instruction sheet can never be a substitute for the teacher, for its purpose is to supplement the work of the teacher.

Among the advantages that may be listed are the saving in class time for both teacher and pupil, the value as a ready reference, and the placement of responsibility of getting the instruction on the pupil so that he must have an active part in the process. A well

organized set of instruction sheets permits the pupil to advance as rapidly as his ability will permit.

Instruction sheets may be prepared by the teacher or they may be purchased from publishers. One criticism made of the purchased sheets is that they are not suited to particular situations. On the other hand criticism is directed toward teacher prepared instruction sheets because they are not well organized and are lacking in sufficient illustrative material to supplement the printed information. Well prepared instruction sheets require considerable time and experience in making, and unless the teacher is well fitted for such work and has ample time it might be well for him to use commercial instruction sheets in so far as they are available. Ericson suggests instruction sheets prepared by the pupil as a third source. [7 : 74–75] While the idea possesses some merit as a procedure for having the pupil think through and plan his own job in a systematic way, a difficulty may arise in large classes because the pupil may have to waste much time while waiting for the teacher to check his plan. With well prepared instruction sheets almost equal value for the pupil could be derived by having him analyze his job and arrange his operations in sequence. Newkirk and Stoddard suggest a similar job plan sheet and procedure card for teaching home mechanics. [21 : 54–77]

Although the instruction sheet may have certain limitations, it is one of the best devices yet developed to care for large classes made up of pupils with all levels of ability. Since the methods of using and preparing these sheets have been carefully studied and developed by well qualified industrial arts specialists, we may look to their increasing use. [136 : 32–33]

Contract Sheets

The contract sheet is a development of the lesson sheet idea. The better type of sheets is organized on a differentiated plan so as to meet more adequately the individual differences in pupils. Manzer claims the contract plan has proved to be a practical and an efficient method for teaching the fundamentals of general shop subjects and the related matters which have some bearing upon them. [88 : 55]

Notebooks

Notebooks are a form of lesson sheets that have continued in industrial arts work since the early manual training schools. The writer finds no reference to their value other than as a means of recording oral instruction so that it would be available when needed. Drawings of the exercise to be made were also often kept in these books.

Manuals

Several cities have expanded their courses of study so that they are used as manuals for the guidance of both teachers and pupils. Beardsley points to the printed course of manual training in Chicago as the first manual ever printed by any board of education. [266 : 206]

Textbooks

The Boston Industrial School Association felt the need for a textbook and immediately set about preparing one. Some of the leaders in industrial arts today feel that altogether too many teachers in the work are failing to make use of books and printed materials. [7 : 146; 68 : 140; 113 : 131–132] Ericson and Smith give several reasons for the attitude of industrial arts teachers against textbooks, and proceed to list reasons why textbooks should be used in industrial arts classes. In 1906, Crawshaw raised the question of why the best books and best methods of teaching were not demanded in the industrial arts the same as they were in the other school studies. [62 : 9] As late as 1920, MacDonald criticized industrial teachers for making too little use of books in their classes. At that time he said it was the exception rather than the rule for shop teachers to refer their pupils to printed information. The majority of them, he said, were still attempting to supply information in verbal form. [91 : 46] A few years later Vaughn and Mays divided teachers into groups who used textbooks and groups who opposed their use. Both these groups felt that a fund of information related to the work being done should be constantly accessible. [33 : 140] With the increasing amount of printed material in the several industrial arts subjects, even though each pupil may not be provided with a textbook it would seem that there is

little excuse for pupils not having access to a good shop reference library.

Drawing

Beginning with schools employing the Russian system of handwork, which did not allow the construction of an exercise or problem without a working drawing first being made, we find the manual training schools, the sloyd schools, and the arts and crafts schools all requiring drawing as an integral part of their work. These early drawings were scale working drawings which were usually copied by the pupil from sketches or other drawings prepared by the teacher. They were sometimes made from models kept for the purpose.

Leland required pupils to design an original pattern before starting work. [200 : 10; 87 : 890] Tadd thought each pupil should be provided with a sketchbook in which he should be required to make a rough drawing and an isometric sketch of each exercise. [32 : 325] Beardsley provided the pupil with suggestive designs and had the pupil develop his own drawing for the problem from these. [265 : 62–63] The New Jersey Council of "Suggestive Course of Study" stated that working drawings should be made by the pupil and handed in to the instructor for approval before the model was made. [234 : 104] In the Denver Manual Training High School a plan was adopted whereby the pupil kept a sketchbook in which he placed freehand dimensioned sketches of such exercises as the instructor assigned. At times the pupil worked from blueprints in order that he might learn to read and work from drawings prepared by others. [55 : 80]

Haney permitted the pupil to modify the structural design and work out his own surface design. Such drawings needed to be prepared in advance of the constructive work by the older pupils. In the case of the younger pupils such a requirement would defeat the ends sought, for the making of a drawing would exhaust both their patience and their interest while they were waiting to do constructive work. Classroom drawing, Haney believed, should correlate with the shopwork rather than be drawings of objects foreign to the pupils' interests. [151 : 155]

Griffith also believed in correlating the drawing with the shopwork. This he arranged on the same group plan used for woodwork, all drawing to be copied from prepared plates. [9 : 26–28] He mentions three common practices in presenting the drawing in connection with shopwork. First, the pupil made a drawing and immediately worked out the object in some material. Second, the pupil made the object first and then made a drawing of it. Third, the first ten or twelve weeks of the course were devoted entirely to the drawing of articles to be made during the year and the remainder of the time was applied in constructing the articles in the shops. [9 : 34–35] The writer has also observed such contemporary practices as using two days of each week for drawing and the remaining three days for shopwork; alternating one week of shopwork and one week of drawing; and also the practice of alternating groups one half semester in drawing and the other half in shop.

Cardulla would first teach the pupil the use of tools and then compel him to originate his own design. He would set up a number of hurdles to challenge the pupil's interest before he allowed any work of a constructive nature. The pupil must first prepare a perspective sketch, a detail drawing, a bill of materials, a list of the tools to be employed, and an outline of the operations to be performed, arranged in sequence with the method of their performance, before he could set tool to any material. [58 : 360]

Jensen used a form of differentiated lesson assignment. He had pupils work from blueprints or blackboard drawings that indicated several forms of construction in the making of an article from which the pupil was to select one which he held to be in accord with his ability. [155 : 455]

In the opinion of Berry, the best method for the pupil to use in planning an object that he wished to construct was first to make a rough sketch in which he would present his general ideas for the consideration of important desirable changes, after which he should make an accurate mechanical drawing. [51 : 159] Drawings in shopwork were also proposed by Vaughn as an "essential means of expression by which ideas of form, proportion and structural relations are conveyed and rendered appreciable." [121 : 217] Hil-

liard, in 1923, was advocating that all the drawing for the course be done at the beginning of the year. [77 : 305]

Shortly after the beginning of the twentieth century fewer statements are found in the literature with reference to requiring the pupil to execute a drawing preliminary to shopwork. During the late nineties, several reports stated that the objects produced in the school shops were being made according to drawings or blueprints prepared by the teacher because the making of a drawing consumed too much of the pupil's time. Several other factors may have been contributing influences in this tendency. Among them may be mentioned the fact that mechanical drawing was establishing itself as a distinct subject in the school and was becoming somewhat separated from shopwork. There was a growing conviction that sufficient techniques of drawing could be learned better in the atmosphere of the drawing room and that only the ability to interpret drawings was essential in the shop. Another factor may have been the increasing number of problem books with suggestive projects already drawn to scale. In the last few years, two of the magazines in the field have been producing problem supplements on tracing paper which may be blueprinted for shop use. Another source of prepared drawings is available now in magazines catering to the interests of model-makers and home-craft workers.

Although these numerous books and magazines may prove a ready source of ideas for the pupil, and save much of his time in the making of drawings and sketches, several objections to their use may be found. The first objection may be found in the tendency of the pupil to copy the article exactly as designed with the result that shopwork is limited to construction only. Second, many of the problems are lacking in the elements of good design and fail to stimulate a growing aesthetic taste.

The literature of industrial arts, in recent years, has not stressed drawings of the object previous to construction work. Even so, Warner observed that this practice continued to find high favor among high school shop teachers. He found that it was the consensus of opinion of one hundred forty high school and sixty-three college industrial arts teachers that a working drawing of the project should be made by the pupil. It was their belief that pupils should

design their own projects even though the idea might not be new and might incorporate ideas derived from similar articles. [122 : 69–70]

Testing

Another teaching device which does not appear to have been utilized to any great extent in the industrial arts field until after the beginning of the second decade of this century is the examination. Evidently the general sentiment was that the finished article was the complete test. Woodward mentions both oral and written examinations as being used occasionally in the Manual Training School of Washington University. Occasional references have been made to the examination in the industrial arts literature since then. Beginning about 1922, and reaching a peak between 1926 and 1928, objective and standardized tests have received much attention in industrial arts work. An important contribution of this emphasis on testing has been the awakening of teachers to the thought content of their subject.

CHAPTER XII

SUMMARY

AT SEVERAL places in the course of this study, interpretations have been made as various points have been developed. The high points may be summed up briefly as follows for the convenience of the reader.

Purpose

The purpose of school shopwork has shown an interesting development since 1871. The original purpose of the Boston Whittling School was to give wholesome and enjoyable work of a type in which pupils would normally engage. During the period of the Russian system the emphasis shifted to the development of tool skills and a knowledge of industrial processes as a means of having the school contribute more directly to the training of pupils for manual occupations. The sloyd system placed a similar emphasis on tool processes but leisure-time enjoyment replaced the vocational aspect. The purpose of the arts and crafts movement was largely that of stimulating an interest in art and an appreciation of better constructive design, together with more opportunity for individual creative expression. During the industrial education movement, emphasis was again placed upon knowledge of trade processes and methods of manufacturing. With the development of industrial arts there is a recurrence of emphasis upon the developmental growth of pupils and their possible future avocational interests, with some stress upon skill and a knowledge of industrial processes.

Method

The class method of instruction was strongly advocated under the Russian system. Each member of the class worked upon identical exercises, each step being thoroughly demonstrated and ex-

plained. All pupils theoretically progressed through the course at the same rate. On the other hand the ideal of the sloyd system was the individual method whereby each pupil was given instruction as the need arose, thus allowing the exercise of pupil initiative and judgment, with progress at a rate commensurate with his ability. The methods of the arts and crafts movement were influenced by both the Russian and sloyd systems. Many schools had minimum prescribed courses which were taught by the class method. As soon as these requirements were satisfied, the pupil was free to use his individual initiative. Several schools, however, subordinated class to individual method. During the industrial education movement many schools attempted to teach shopwork by the factory production method. This factory method was characterized by group quantity piece production. The individual craftsman method was adopted in manual training, sloyd, the arts and crafts, and the industrial arts. The method of industrial arts is chiefly individual with the class method subordinated to the individual method.

Courses of Study

The course of study of the Russian system consisted of a graded sequence of required exercises typical of tool processes in basic trades. A graded series of useful models suitable for classroom or home consumption made up the course of study for the Swedish system. Courses of study during the arts and crafts movement consisted, in general, of a logically organized series of exercises followed by prescribed articles of utility that involved application of specified processes, after which the pupil was permitted, within limits, to select, design, and construct such articles as might appeal to his interests. With the growth of the industrial education movement the course was built around the quantity production of projects suitable for home, school, and community uses, together with related information in the nature of production methods and organization. Courses of study in industrial arts vary from the determination of the course of study by the pupil through his selection of problems to a rigid, formal, prepared course. It would be quite safe to say that the majority of courses are based on processes selected from an analysis of some basic trade. An attempt is made

to guide the pupil in a selection of projects that will in the end involve all the processes considered essential. Incorporated in the course is a treatment of the industrial information relevant to the particular shop subject.

Type of Product

The product of the pupils' labor in the school shops using the Russian system was, for the most part, the abstract exercise, which had no value other than its function as a means of developing tool skill. Under the sloyd system, the pupils were required to work out the useful model. During the arts and crafts stage the physical product of the pupils' shopwork was both the exercise and the useful article, with the greater emphasis on the latter. Both the industrial education movement and the industrial arts movement have stressed that the concrete problem of the shopwork should be a useful article.

Selection of Problem

Under the Russian and sloyd systems the pupil had no choice in the selection of the problem, but made such articles as the teacher dictated. Later, with the development of the arts and crafts movement some leeway was given the pupil in the selection of a problem after he had completed a certain specified course. In a few schools he was permitted a modified choice or a free choice in his selection from the beginning. The nature of the shopwork under the industrial education movement required that it be closely organized. The projects were determined by the teacher, or under his *indulgent* guiding influence. The practice in the industrial arts is to permit the pupil a choice of the problem on which he will work. The problems selected determine their own sequence of information and processes. In some cases the selection is made from a suggested list of problems; in other cases the selection is guided by definite teacher determined processes or operations that must be incorporated.

Class Size

The class size of early public manual training schools during the

pioneer period ranged from two to twenty-five, with a median of twelve. In the manual training high schools, the range was from twenty to twenty-five. Sloyd classes were small also because one of the principles of the system was that the class should allow for sufficient individual instruction. On the whole, class sizes have tended to remain at twenty to twenty-four until the present economic crisis, which has brought about noticeable increases in the number of pupils enrolled.

Time Allotment

Time allotments show a wide range. The early manual training high schools devoted three hours each day to drawing and shopwork. During the same period, a single two-hour period per week was the usual amount of time given to shopwork in the grammar schools. An examination of the Report of the Commissioner of Education for 1893–1894 shows a range from 15 minutes per week to 960 minutes per week. The median of the report was 152.2 minutes per week. At the present time 90 to 300 minutes per week appears to be the usual amount of time given to shopwork.

Scope of Activity

Shop subjects of the pioneer public manual training schools were practically limited to a form of bench woodworking. One of the ten schools reported a course in printing and another, a course in woodcarving. During the same period the School of Mechanic Arts and the Manual Training School of Washington University were offering a total of nine different shop activity courses. By 1886, the Toledo Manual Training School had enlarged its program so that it was offering eleven shop courses. A few years later the Report of the Commissioner of Education lists seventeen different shop courses that were being taught. A composite of studies made by Edgerton and Strickler, in 1924, and Warner, in 1928, shows sixty-nine different shop activity courses.

Production Work

The teacher of shopwork has been faced with the problem of production work for school consumption since the early days of

manual training. Love found it necessary to have his pupils do the printing of the board of education in order to forestall criticism of the public. In a number of instances since that time, reference is made to the maintenance and production of school equipment by pupils. Only one system, the sloyd, appears to have escaped this practice.

Values Suggested

Several suggested values are constantly recurring in this work. Most constant among these are the following:

Keeps pupils in school.
Tends to systematize work through planning.
Cultivates imagination.
Has moral force.
Dignifies manual labor.
Provides discipline.
Furnishes physical exercise.
Trains powers of observation.
Gratifies and stimulates desire of mastery and control.
Rounds out the development of the pupil.
Inspires an interest in art.
Provides an opportunity for expression.
Contributes to the general culture of the individual.
Offers vocational guidance.
Provides vocational training.
Gives proper social outlook.

The first ten of these were characteristic claims of the manual training period but have continued to be expressed in the later movements. The most consistent of these suggested values have been the claims of vocational guidance and vocational training. Although they were not emphasized so strongly in the sloyd system, nevertheless they were implied in the principles of sloyd. All of the remaining claims are evident in each of the movements, with the exception of "inspires an interest in art," which was presented during the arts and crafts movement and has persisted through the remaining periods.

Where so many values have been claimed by so many persons working in the educational field during a period of sixty years, it is presumptuous to say that these claims may not have some foundation in fact although it is granted that some of these values must be more clearly demonstrated in the future. This is the province of another study.

CHAPTER XIII

TRENDS

WORK of industrial arts nature was started in 1876 in the United States because of the need of engineering schools to provide technical practice for their students. Almost simultaneously private philanthropy saw in the work an opportunity to supplement the work of the regular schools for those students who were unable to complete or had no desire to complete the regular courses of study. Some leaders saw in it the possibility of making education more generally practical. Their advocacy of the work intrigued others who saw in it a school substitute for a vanishing apprenticeship system. Public interest was aroused and as a result the work was firmly intrenched in most large public systems before a generation's time had elapsed.

It required the widespread establishment and experimentation with vocational industrial work to prove that it could not function as efficiently as its advocates had hoped. One of its firmest and most articulate supporters, Dr. Charles Prosser, finally came to the realization, in evaluating the progress of the vocational objective, that it had failed and that it could not hope to succeed. He so recorded his changed point of view in a speech before the members of the American Vocational Association, in New York City, in 1931. Taking a forward-looking point of view, he advocated a more liberal type of public school work that should be based upon the educational needs of pupils rather than upon nebulous vocational possibilities.

By the end of the first decade, Dr. Felix Adler and Dr. Nicholas Murray Butler were dissenters from the vocational emphasis and were favoring manual education for its strictly cultural values. Certain early leaders like Woodward, sensing the cultural contributions of manual work because of its objectivity in a wholly ab-

stract education, concurred in these points of view and gave them lip service without making functional changes in their courses of study. As a consequence the movement became muddled in its beginnings and there was established a dichotomy which persists to the present.

There are those, still talking of cultural values, who, having been taught by methods which preclude cultural possibilities, persist in adhering to vocational traditions in their teaching methods. There are those who use materials, tools, and processes without concern for vocational mastery and who are completely emancipated from the vocational objective. They have substituted the child and his needs and growth possibilities in the place of perfectly executed models in dictated sequences. Four years spent as a student and teacher in a graduate training institution have given the writer many evidences that a ferment is going on in the field that needs only the touch of leadership to present its philosophy and give direction toward a development of widespread cultural significance.

Evidence in this study supports the following trends:

1. *Decreasing teacher dictation*

There has been a tendency away from the practice of the manual training period in which the teacher gave such explicit, detailed information and instructions about the work that the pupil had only to follow directions. The responsibility for analyzing the job, organizing the procedure, and carrying the work through to completion is being placed more and more upon the pupil.

2. *Increasing pupil choice of problem and subject matter*

There has been evident a movement away from the inflexible series of teacher determined exercises and models which continued through the stages of modified and guided pupil choice of a problem to a greater freedom on the part of the pupil to select such problems and subject matter as makes the greatest appeal to his interest and is best suited to his development.

3. *More opportunity for pupil experimentation*

A change of mental perspective on the part of the teacher has

given increased opportunity for the pupil to develop problems that could not be worked out previously in school shops. The increasing number of materials that are now being utilized in shopwork, together with the greater pupil freedom in the selection of a problem, opens up an avenue of many possibilities. The general shop increases the range of possibilities, for it is equipped as a central unit for work in a wide range of materials.

4. *Fewer abstract exercises*

The original theory of manual training was that instruction could be given only through the required course of exercises. The pupil seldom advanced beyond the exercises into useful problems. Later developments were somewhat modified. One modification was to require a short prescribed series of exercises at the beginning of the course to be followed by useful applications of the principles which were involved. This was later modified to require the pupil to make only a practice exercise of each new process that needed to be incorporated into whatever was being made.

5. *Less pupil exploitation on production work*

Teachers are analyzing their field more thoroughly for adequate teaching content. Production jobs are being accepted and used only insofar as they possess educational value. Pupils are not required to pursue work where repetition of processes shuts out the possibilities of further significant learnings. It is recognized that a certain amount of practice work is necessary in mastery of any kind, but this is not unreasonably extended for the sole purpose of finishing work. The emphasis is upon pupils rather than work.

6. *Revolutionary emphasis toward individual instruction*

Manual training teachers were early aware of the differences in the ability of pupils, but little, if anything, was done about it. One of the greatest contributions of the sloyd system was the emphasis upon individual oral instruction. Today we find this idea of individual oral instruction extended to include many graphic aids which may be utilized by the pupil at any time he may require information. Many industrial arts leaders today have proposed the prin-

ciple that instruction *must be* individual. This point of view has been forced because of the prevalence of the great range and variety of pupil projects that are being undertaken. Common sense suggests that a pupil be given instruction when he is up against a difficult problem and is in need of help.

7. *Expansion and refinement of instructional devices*

a. The demonstration: The demonstration is individual and confined to the elements of a problem with which the pupil is having particular difficulty. It is more infrequently inflicted upon a group or whole class regardless of need. It takes on more character as a helping hand than as an elaborate, inflexible ritual.

b. Lesson sheets and texts: Early schools made almost no use of lesson sheets and texts. There is now available a great mass of such helps which is broad in variety and clear in its presentation. There is a significant movement to refine this material further and to include a wide range of graphic aids.

8. *A much closer bond with the academic subjects of study*

Beginning with the arts and crafts movement an increasing emphasis has been placed upon utilizing the shopwork to motivate and vitalize the classroom subjects. The development of industrial arts further stimulated this activity and established the work as a content subject on somewhat the same plane as the other school subjects. This is particularly true in the elementary school where a greater emphasis is being placed upon an objective type of work. Secondary school integrated course work makes significant use of the industrial arts.

The sixty years that shopwork has been in the schools is a comparatively short while for progress to develop and be fully evaluated. When it is realized that a handful of the first teachers of the work are still active and that they represent a living remnant of a universal practice that has withstood progress, our present consciousness of better methods and greater values is a tremendous advance of almost meteoric character.

Academic subjects have labored under centuries of tradition to arrive at the place of readiness for the progressive movements of

the latter part of the period covered by this study. Industrial arts education is still in its formative stages. The ultimate extent and character of the changes which may be effected through the trends, which were enumerated above, is a matter of conjecture. More than one educator has learned to observe patience and have faith in the statement of Dr. Butler to the effect that "The truth is that progress in this as in other matters goes on without our knowing it, and it is only after the lapse of considerable time that the visible efforts of this progress engage our attention." [128 : 2]

To the extent that the newer emphases in industrial arts education are accepted and taught by incumbent members of teacher-training staffs, we may expect reasonable change to become tangibly evident. An impartial presentation of the data of this study to prospective teachers, coupled with a broad opportunity for them to test the merits of the most important diverse methods in actual teaching situations, should enable them to judge for themselves the ones they may use best in giving efficient instruction.

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